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Wisconsin Mills Benefit by Pulp Scarcity

Decline In Production of Wisconsin Pulp Mills Since 1937 Now Being Overcome As Pulp Shipments From Canada and Scandinavia Drop—Expect State To Regain High Position In Pulp Production — Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 8, 1940—Some of the declines noted in the production of wood pulp in Wisconsin since 1937 are being overcome by the scarcity of supply from Canada and the Scandinavian countries. The interruption of production and shipping caused by the European conflict has been a boon to the 30 pulp mills of Wisconsin, and many of them are operating at capacity. It is still necessary to import large quantities of pulp wood from Canada due to the lack of a sufficient supply from Wisconsin forests, but favorable prices are an aid in keeping the mills on a full-time basis.

Comparative figures show that in 1937 the value of the 638,000 tons of wood pulp produced in the state was $28,000,000, and the value of 941,000 tons of paper produced here was $87,000,000. Wisconsin then ranked third in wood pulp production and fifth in paper production. Pulp production, however, dropped to 586,000 tons in 1938, valued at $24,000,000, and paper declined to 882,000 tons, the value of which has not yet been totaled.

Expect State to Regain Top Position

There is constantly growing evidence that Wisconsin will eventually regain a top position in pulp production because the problem of nearby sources of permanent supply is being met. Reforestation has been extensive, pointing to the day when plenty of timber will be available. A report by the Wisconsin state planning board shows that national forests embrace 1,828,000 acres; county forests, 1,720,000 acres; state forests, 183,000 acres, and privately owned forests, 145,000 acres. Foresters are replanting 30,000 acres per year with 30,000,000 trees. Maturity for pulp wood usage requires an average of 50 years. The Nekoosa-Edwards Paper Company, Port Edwards, Wis., has carried on its reforestation program for 10 years and is replanting 3,000 acres per year to provide a permanent supply of pulp wood.

Scientists at the United States Forest Products Laboratory at Madison, Wis., have gradually expanded the sources of pulp for paper. In 1899 only spruce and poplar went into wood pulp paper. Hemlock was added in 1909 and yellow poplar and jack pine in 1920.

Scientists have likewise made impressive studies of the conversion of mill waste. Utilizing lignin, formerly defying any commercial usage, sawdust and other waste are now used for a plastic equal in quality of any other plastic on the market, and much cheaper. It is being manufactured commercially in a plant established especially for this purpose by the Marathon Paper Mills Company, Rothschild, Wis. Lignin also has been broken down into various chemicals and is an important source of supply for wood alcohol.

Integration Wood Using Industries Likely

Concentration and integration of all wood using industries appears to be the next step in stabilizing the industry, experts believe. These include sawmills, pulp mills, chemical plants and the like.

Dr. C. E. Curran, chief paper chemist at the United States Forest-Products Laboratory states: "It should prove desirable to obtain the raw materials for wood pulp mills as by products of the management of forests for saw timber. Wood would be available from cultural operations, from salvage of dead trees, from logging and milling wastes, and when operations are properly correlated it should be relatively cheap to the pulp mills. Integration of this sort has been of increasing importance in the northern European countries and doubtless is a significant factor in the ability of their industry to compete in our market.

This picture of the forest industry of the near future was drawn by Dr. Carlile P. Winslow, director of the forest products laboratory:

"It seems likely that the economic benefits of concentrated operation on a limited area will be realized more fully than in the past. With migratory tendencies eliminated and with governmental encouragement of sustained yield, the trend toward stabilization should be marked.

"Since the time and cost of growing a crop of timber will be clearly recognized, there will be a definite trend toward salvaging all values possible from parts of the tree that now fall to waste in woods and mill. Utilization becomes more intensive in many lines. Forest industry should become more broadly diversified and yet more closely integrated, with th sawmill, the veneer mill, the fabricating works, the pulping plant, the chemical factory, forming a multiple hook-up.

"Permanent rather than temporary operations, quick regrowth and the shortest practicable cutting cycle will be required. Logging will provide both for removal from the forest of the material that should

(Continued on page 25)

Canadian Pulp and Paper Industry Improved

With Newsprint Mills Operating At About 80 Per Cent of Capacity Members of the Industry Question Quality of Output of Some Old Mills —Royal Bank of Canada Expects Increased Exports to U.S.A. This Year.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 8, 1940—With newsprint mills operating at around 80 per cent of capacity in the closing weeks of the past year, the question has been raised as to how near they are to full commercial capacity operations. The Royal Bank of Canada, in its Monthly Letter, suggested that this limit may have already been pretty well reached, and that while operations have been resumed at some mills which had been closed prior to the outbreak of hostilities in Europe, the quality of their output has been questioned by members of the trade. Of course this idle capacity could be brought up-to-date, and this may be undertaken progressively if increasing demand justifies it, but the Bank says that producers will naturally be reluctant to undertake heavy expenditures to secure increased production to meet the demand formerly filled by imports from Europe, "unless continued markets are assured for a reasonable period."

Definite Improvement in the Canadian Industry

Reviewing the pulp and paper industry as a whole, it says that despite conplications that have arisen resulting from the war, the situation has definitely improved and that a further gain in exports to the United States may be anticipated in 1940. It goes on to say: "In spite of improvement in demand, prices of newsprint have not risen and contracts for the first half of 1940 have been closed at the prices which have prevailed during recent months. The actual return to the Canadian producer, however, is augmented by the premium of 10 per cent now prevailing in Canada on United States funds, and the marked rise in wood pulp prices must tend to improve the position of the Canadian producer.

The British Paper and Pulp Market

"Paper and wood-pulp in Great Britain, ordinarily a large importer, were placed under government control at the beginning of the war and imports of paper-making materials are only permitted under license. The Paper Control Board has established maximum prices for all grades of paper and the Ministry of Supply has taken over all stocks of wood-pulp for paper making. According to a recent report of the Canadian Trade Commissioner, this action is intended to conserve foreign exchange and to maintain operations at British paper mills. In the past, domestic output has not satisfied local requirements. A reduction in the size and ordinary news-stand circulation of British periodicals, however, has already taken place and it is estimated that British mills will be able to fill the country's war-time demand for newsprint. Other types of paper will continue to be imported, but the shorter distance from Scandinavia as compared with Canada will probably influence the direction of this trade.

"Australia and New Zealand depend primarily upon imports for their supplies of newsprint and other papers but little or no increase in demand is anticipated, as these countries will be seriously affected by higher shipping costs. South American countries have increased imports from Canada in the last few months, as a result of the uncertainty of Scandinavian deliveries, but Canadian shipments to this market will probably meet with competition from New Foundland, ordinarily an important exporter to Great Britain.

Exporting Countries Look to Scandinavia

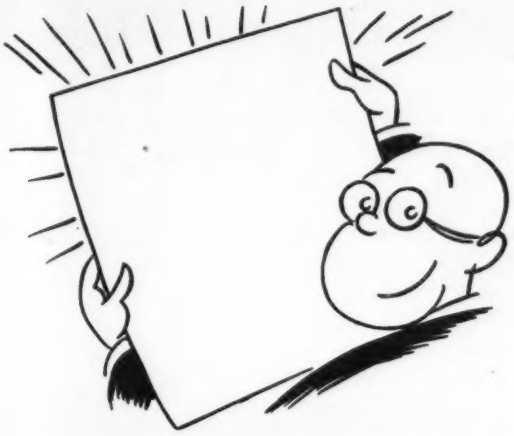
"Insofar as exporting countries are concerned, the major question at the present time is the future of the Scandinavian industry. Finnish mills, of course, are not producing and the position in Sweden and Norway is, to say the least, doubtful. During September and October, the latest months for which statistics are available, exports of newsprint to the United States were above those of the corresponding months of 1938. Total deliveries of European newsprint in the United States during the first ten months of 1939 reached a record total of 278,681 tons, as compared with 193,720 tons in those months of the preceding year. This is, however, considerably less than the Canadian industry can ship to the United States in one month.

"The Canadian industry has been operating at consistently higher levels this season. According to the Newsprint Association of Canada, output in November was the highest for the year, amounting to 288,726 tons or 79.7 per cent of rated capacity. This compares favorably with operations at 69.3 per cent in November 1938, but is still below production in 1937. In that year, usual demand from the United States, in anticipation of price increases, resulted in average operation of Canadian mills at 93.9 per cent of rated capacity. If the anticipated increase in shipments to the United States in 1940 is realized, a high level of operations will prevail in the Canadian industry during the coming year. Manufacturers of fine papers and high-grade chemical pulps also report increased operations with some mills already on a 100 per cent basis."

Your Income Tax

The new 1940 edition of "Your Income Tax", by J. K. Lasser, published by Simon and Schuster, New York, has just been published at $1 a copy. This up-to-date edition includes the many important changes in the revenue law and court decisions and a special section gives a summary of the changes made during the past year.

This book clearly and concisely explains in an untechnical manner, the many questions arising in making out an income tax return. As various forms are explained it is unnecessary to read all the text. The inclusion of a specimen form, with references to the correct explanations in the book is a most useful feature and makes it comparatively simple to properly fill out an income tax return.



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Makers of **WHITE STAR** *Rubber Covered Rolls,* **TANNITE** *Couch Rolls*
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Chicago Expects More Active Market Soon

Midwest Trade Seasonally Quiet During Annual Inventory Period But Strong Demand For Paper Is Expected By Middle of Month — Lower Grades of Waste Paper Are Less Active and Higher Grades Strong.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., January 8, 1940—The paper market in Chicago showed no particular activity during the past week though there were plentiful signs that the upward trend might be renewed within the next ten days. Local offices reported the trade still in the throes of inventory taking but did point out the numerous requests indicative of future strength.

The lower grades of waste papers were reported as less active during the Christmas period with the supply plentiful. The higher grades, however, maintained strength as a reflection of the scarcity situation in the general pulp market. Groundwoods were firm but inactive during the week as were krafts though there were plenty of signs of spirited demand to come. Sulphite bonds were steady in all grades though orders were not numerous. Books and covers changed little during the holiday period but were expected to respond materially to the better business which this area has experienced. Bonds and ledgers were comparatively inactive though inquiries were reported as good.

Paper Trade Successful in Fund Drive

The Chicago paper trade was within about 5 per cent of its quota in the annual Community Fund drive as the New Year rolled around. Faced with the necessity of raising $40,000, the paper trade executives had already secured $38,000 as their share of the $3,611,000 which was the goal for the entire city. Over $3,528,764 of that ultimate goal had already been reached and reached many weeks ahead of previous years when drives of this nature have extended into February and March. A. G. Ballenberg, treasurer of the Morris Paper Mills, has been chairman of the paper committee with Leo S. Altholz, Inlander-Steindler Paper Company, as head of the advisory committee. Vice chairmen who did such an excellent job of fund raising include the following: A. G. Shannon, International Tag & Salesbook Company; H. S. Eckhaus, Central Bag & Burlap Co., M. G. Fessenden, Ace Carton Company; R. W. Darnell, W. C. Ritchie & Company; E. J. Loewenthal, Schwarz Paper Company; W. W. Goldberg, Bateson & Company; George K. Gibson, Mosinee Paper Mills Company; Logan W. Miller, Fraser Industries, and T. F. Woody, Pioneer Paper Stock Company.

Fred Randolph Killed

Fred W. Randolph, secretary of the Heco Envelope Company, was killed in an automobile accident while driving to his home west of Chicago. The fatal accident occurred during the Christmas holiday season. Mr. Randolph was one of the most widely and favorably known executives in the envelope industry. He is survived by Mrs. Randolph.

State Legislature in Special Session

The Illinois Legislature is expected to go into special session within the next ten days although no one is certain as to what will be included in the Governor's call. The matter of old age pensions is likely to be foremost and paper executives who operate under the Illinois Unemployment Insurance Act are quite hopeful that the call will also permit enactment of amending statutes conforming to Federal social security amendments involving the placing of wages paid and payable features and the $3000 limitation feature in both the unemployment insurance and old age titles. From an accounting standpoint, local paper firms feel that this would be a step in the right direction. There is some concern evidenced over pressure directed against the Governor to include relief in the call. If this is the case, then the Legislature may get into consideration of more taxes for Illinois—a development which would cause some consternation for all classifications of business in this State. The session may last for some months although the April election primaries and the Fall elections are expected to put a crimp into much of the activity.

Paper Men Interested in Packaging Contest

Several Chicago entries have ben reported for the Fifth Wolf Retail Award which is to be a feature of the coming convention of the National Retail Dry Goods Association in New York City. The Wolf Award is to be awarded to the retailer who has done the most effective packaging during 1939. There are eleven classifications in which packages may be entered including awards for the package of greatest attractiveness printed in single color; the package most effective from the standpoint of visibility; the best redesigned package and the best Christmas box. A distinguished jury of judges will make the selections.

Capital Paper Co. Holds Sales Meeting

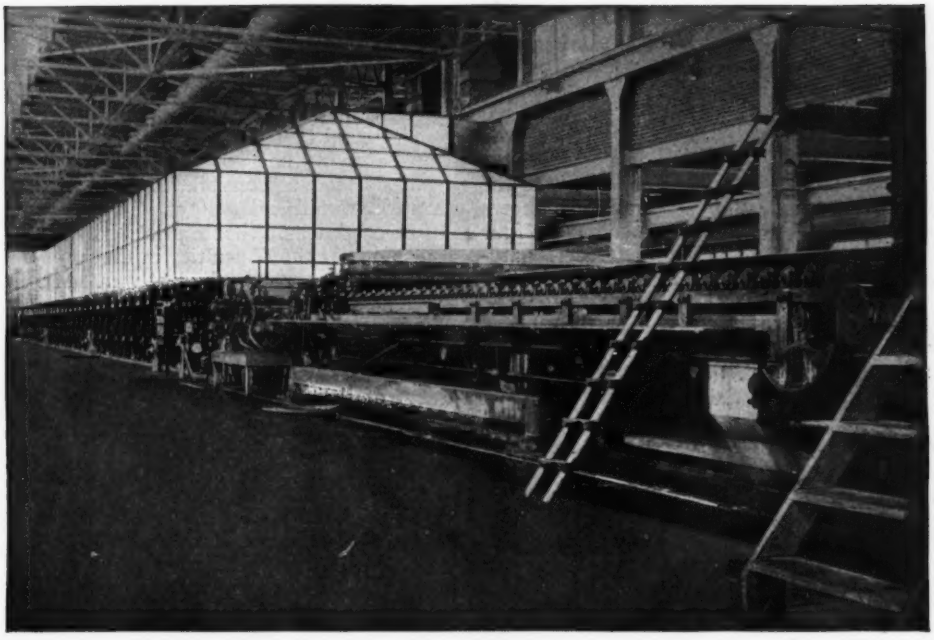
[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., January 3, 1940—The Capital Paper Company here last Wednesday, Thursday and Friday, held its annual sales convention in the Hotel Lincoln. Managers and their salesmen from branch houses in Ohio and Illinois attended. One section of the hotel was converted into an exposition where all lines of paper and paper products sold by the company and the complete line of products manufactured by the company were on display.

The first evening there was a buffet luncheon for customers of the company and invited guests. C. V. Jewell, sales manager, was host and made an address of welcome. A highlight was the visual educational program. Special motion pictures showing the manufacture of various products from representative paper companies were shown and the method of manufacture explained by experts. Meetings the last two days were closed to all but company men, with Mr. Jewell presiding and members of the sales staff participating in general discussions.

The annual banquet, entertainment and floor show was held the last night in the hotel banquet hall with Samuel Mantel of this city as guest speaker.

ANOTHER BELOIT MACHINE



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THE BELOIT WAY BELOIT IRON WORKS PAPER MACH'Y BELOIT, WIS. U.S.A. **IS THE MODERN WAY**

Toronto Reports Many Paper Price Advances

Advances of $5 Per Ton Upward On Book Papers Now In Effect and Advances of $15 Per Ton To Be Made On Some Rag Papers Effective Apr. 1—Abitibi to Continue $50 Ton Newsprint Price—Other Late News.

TORONTO, Ont., January 8, 1940—Price advances from $5 per ton upwards went into effect at the first of the year on book, magazine and catalogue papers. Some rag papers were advanced as high as $15 to $20 per ton. One explanation given by the mills is that the price of pulp required for the making of stock has sharply ascended. The new quotations, on papers are effective until April 1. The increase was expected, and on all orders placed within the last few weeks but not completed, the new rates will prevail. It will be recalled that when war broke the mills and wholesalers withdrew quotations (which had not changed for many weeks) and all business was accepted at the figure holding when delivery could be made. Some of these orders have not yet been filled owing to the rush which set in early in September. Producers have been rushed to the limit and are still from four to eight weeks behind their schedule. Orders naturally slowed up after a time but capacity production has not yet overtaken all the business in hand. All the mills have had a good year by reason of war conditions, and improvement will be reflected in their financial statements which will be forthcoming at annual meetings to be held in the near future.

Specialty Paper Mills Busy

Specialty plants have been exceptionally rushed and the outlook for the paper trade during the first few months of 1940 is regarded as bright. The future is much more promising than it was a year ago. With the jobbers, who are busy taking stock, business is rather quiet just now but it is expected before the end of the month there will be plenty of orders from printers, converters and large consumers.

The demand for glazed papers has kept up well while the call for coated stock has been maintained. The demand for board continues good and paper box plants were busy up to the holiday period but since then there has been a seasonal recession. The requisitions for paper stock have been active and dealers have no heavy reserves. The price situation has not changed but no one can tell what the future will reveal.

Canadian Wholesale Merchants Meet

The annual meeting of the Canadian Wholesale Paper Dealers will be held at the Royal York hotel, Montreal, on Thursday, January 23. H. F. E. Kent, president of W. J. Gage & Company, Toronto, is head of the association, a position which he has filled for two years. Ivan Moffitt, Toronto, is the secretary. The convention will last only one day when reports will be presented, officers elected and other business transacted.

The annual Yuletide reunion of the United Paper Mills, Limited, Toronto, was held recently at the Royal York hotel. R. I. Finlay, president, was in the chair and representatives were present from the company's branches in London and Hamilton. At the business session C. W. Paull, sales manager, presided and a satisfactory year was reported. George Hargraves of the city sales staff, is holidaying in Florida and C. W. Paull will spend the winter at Fort Lauderdale, Florida, for the benefit of his health.

A convention of the representatives of the E. B. Eddy Company, Hull, was held recently at the Chateau Laurier, Ottawa. V. M. Drury, president of the company, presided and representatives of the firm were present from Coast to Coast, numbering about fifty in all. In speaking of the paper situation, Mr. Drury said that the period they have to go through was a trying one and hostilities in Europe had increased their responsibilities. His hope was that the conflict would end soon as he much preferred peace time conditions. Stable prices had helped to eliminate some of the difficulties in the paper industry that were encountered in the last war. Mr. Drury added that there was every hope that prices would be held under reasonable control. Soaring prices would not help at this time and would only prevent recovery after the war was over. John F. Taylor, vice president of the company gave a history of E. B. Eddy, founder of the firm.

Abitibi to Continue $50 Price on Newsprint

The figure of $50 per ton for newsprint announced some time ago as effective until the end of the first quarter of 1940 will be continued throughout the second quarter of the year by most operators. G. T. Clarkson, Toronto, receiver and manager of the Abitibi Power and Paper Company, Limited, states that the current price will be continued at least through the first half of the year. The various companies, which had extended the $50 price acted independently but there might be higher prices quoted in some circles, said Mr. Clarkson.

Ontario Barking Plant High Producer

1939 saw a major industry for Thunder Bay district go into production with the completion of the big barking and shipping plant of the Ontario Paper Company at Heron Bay, 62 miles east of Schreiber on the Canadian Pacific railway. James E. Davis is resident manager.

The $1,000,000 project completed after about a year of construction work and which saw a new modern town site spring up, experienced a busy summer providing work and wages for more than 100 men, residents of the district.

The Heron Bay plant is owned by the Ontario Paper company, which in turn is owned and controlled by the Chicago Tribune of which Col. Robert R. McCormick is president. The wood, taken from the limits adjacent to Heron Bay, is shipped from the barking plant to the company's mill at Thorold, Ontario, where it is turned into paper for the Chicago Tribune.

Dilts-Cowles HYDRAPULPER

BETTER PULPING

· at greater speed

· at lower cost

YESTERDAY'S PULPING systems are practically antique when compared with the new, startling Dilts Hydrapulper System. Almost overnight, the greater production speed, the lower power cost, the uniformity of stock and the tremendously increased output of the Hydrapulper have made ordinary pulping systems obsolete.

It is nothing short of amazing to see batches of 500 pounds up to 5,000 pounds fed to the Hydrapulper—in complete bales, laps or slabs—and to see them fully pulped to any desired consistency in from five to fifteen minutes.

The Hydrapulper seems unlimited in its application to batch systems or continuous operation. It is so flexible that there is a definite need for it in nearly every paper making plant.

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e Hydrapulper is fully protected patents and patents pending. fringement will be prosecuted.

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FULTON, N. Y.

Philadelphia Expects Good Sales Volume

Increase of 20 Per Cent In Wholesale Paper Sales During Last Quarter of 1939 Expected To Carry Over Business At Good Level Into First Quarter of 1940 — Paper Trade Association Elects New Directorate.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., January 8, 1940—With the business outlook for the current year confused by conditions abroad and politics at home, the prevailing opinion appears to emphasize that an appreciable pickup based on the psychology of the demands of peace-time buying is in prospect, rather than on prospects based on hostilities in Europe.

W. B. Killhour, Jr., president of the Paper Trade Association of Philadelphia, and the Quaker City Paper Company, states: "It is very gratifying to report for the majority of the paper merchants of Philadelphia, that the definite upswing in business experienced by most trades the past Fall, was likewise experienced by the paper trade, although earlier in the year local surveys showed that the average wholesale paper house in Philadelphia was doing 10 per cent to 12 per cent better business this year than in like months of 1938. Still, to many, it was not much more than a 'break-even' basis. It is understood that most wholesale paper men in this area refer to October and November of 1939 as peak months for the year, and in some cases for several years. The increase during the Fall was at least 20 per cent or better."

George K. Hooper, president of Philadelphia Paper and Cordage Association, and Hooper Paper and Twine Company, said: "Since the predictions of leaders in the advertising field are that the volume for 1940 will be greatly increased due to the currently improved trend of business, which of necessity will redound to the good of paper merchants, my prediction would be more or less an appraisal on the normal developments that ought to arise from the firm base for healthy recovery which already has been laid. With world conditions as they are, however, it is my thought that we in the paper business must operate more or less on a day-to-day basis until the future of our economic prospects is determined."

Paper Trade Association Meets

Notice of the annual meeting of the Paper Trade Association of Philadelphia for next Wednesday, January 10th, at the Downtown Club, was received by members of the Association this week. At this meeting the Nominating Committee will make its report, and election will be held for the entire twelve members of the Board of Governors—six members of the fine paper houses and six members of wrapping paper houses. The officers for the coming year will then be elected by the Board, which is in accordance with the By-Laws of the Association.

Paper Cordage Men Elect Directors

At a meeting of the Philadelphia Paper and Cordage Association, held in Graf's Restaurant on Thursday evening, January 4th, appointments on the directorate and committees of the following were announced:

Directors: Joseph H. Miller, Garrett-Buchanan Company, Everett Hoffman, J. E. Fricke Company, J. R. Howarth, J. R. Howarth Paper Company, Inc., F. M. Kurz, Whiting-Patterson Company, E. K. Lay, E. K. Lay Company, Harry S. Platt, Denney Tag Company, E. L. Richards, Buffalo Envelope Company, Arthur B. Sherrill, Beveridge Paper Company, John J. Shinners, Acme Specialty Company, and George K. Hooper, Hooper Paper and Twine Company, Inc.

Membership Committee: John R. Howarth, chairman, E. L. Richards, John S. Heverly, Garrett-Buchanan Company, and Carroll T. Gardner, Groveton Paper Mill.

Entertainment Committee: John J. Shinners, Amos M. Coath, Frank W. Winnie & Son, Inc., E. K. Lay, Lee F. Johnson, Gummed Products Company.

News Nonsense: Frederick I. Brower, Editor, Atlantic Gummed Paper Corporation.

Finance Committee: Philip F. Rudolph, chairman, Philip Rudolph & Son Company, W. E. Williamson, Penn Paper & Stock Company, and Richard W. Gifford, H. M. Gifford Mfg. Company.

Publicity Committee: Harry S. Platt, chairman, Denney Tag Company.

Golf Committee: E. L. Richards, chairman.

Garrett-Buchanan To Give Party

On January 19th, the Garrett-Buchanan Company will have a get-together dinner party of all its officers and employees, including elevator operators and truck drivers from their three houses, namely: Philadelphia, Baltimore, and Van Reed Paper Company, of Reading, Pa., at McAllister's, 1811 Spring Garden street. An elaborate program of entertainment, music and dancing has been arranged.

It will be recalled that at this time last year, a similar party was held in the Philadelphia headquarters of Garrett-Buchanan Company, which marked the celebration of the fortieth anniversary of president Morgan H. Thomas' association with the company, but because of the inadequacy of the Philadelphia plant to accommodate all those who will attend this year, it was found necessary to hold it at McAllister's.

Penn. Salt to Erect Refinery

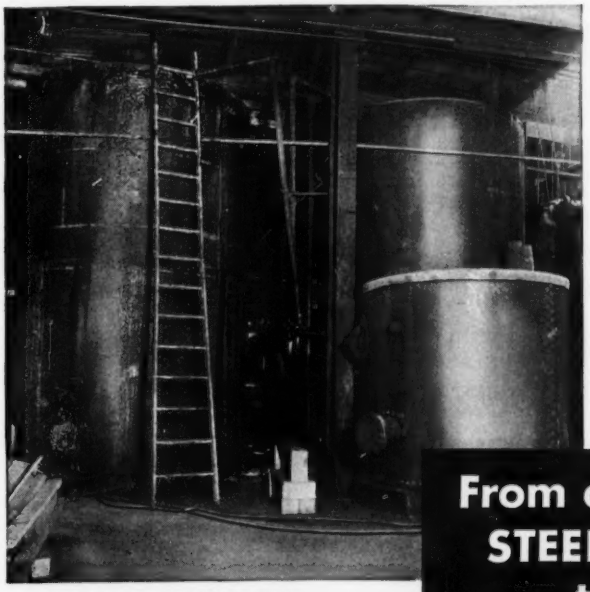
[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., January 2, 1940—The Pennsylvania Salt Manufacturing Company of Philadelphia, with plants scattered throughout Pennsylvania, other parts of the United States and Canada, announces purchase of 50 acres in Cornwell Heights, Bucks County, Penna., for the erection of a new $2,000,000 refinery.

The site includes the former Taylor shipbuilding property, owned by the Carlton Company, a subsidiary of the Traylor Engineering and Manufacturing Company of Allentown, and has a frontage of 2,000 feet along the Delaware river.

Don't "JUNK" Old Tanks!

Reline them at Lower Cost—with STAINLESS-CLAD STEEL



These Old Tanks were ready for the discard, but were made suitable for a great many years of added service by relining them with IngAclad Stainless-Clad Steel.

A large Paper Mill, in the middle west, faced a problem which may also be present in your plant. Certain tanks required either replacement or relining. Stainless service was desired. The cost of constructing new tanks of the solid stainless metal, or of relining these old tanks with solid stainless sheets of the necessary thickness, exceeded the amount it seemed practical to pay. The Plant Engineer investigated the use of IngAclad, and the economies it offers, with the result that today these old tanks are giving full stainless service, and the cost of this plant improvement has been much less than was anticipated.

This is just one illustration of the savings IngAclad is making for the Paper Field.

From a Useless STEEL TANK to a STAINLESS TANK in a Few Days

ALL THE WORK WAS DONE RIGHT IN THE PLANT

There was no expense for tearing down and removing the old tanks. Sheets of IngAclad, cut to exact size required for this job, were delivered direct from our steel mills. Welders were quickly in action. Our regular "lining-procedure" blue prints were followed.

USE OF STAINLESS-CLAD STEEL NOW PRACTICAL

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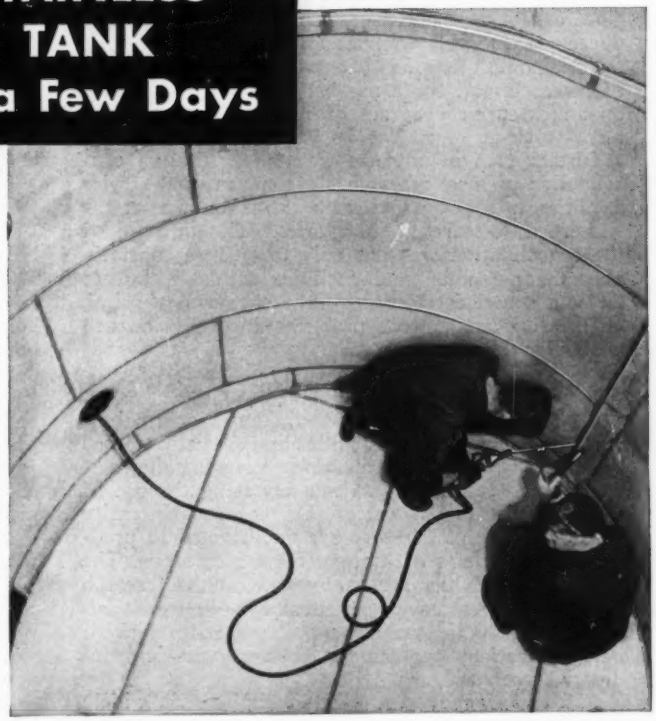
STAINLESS-CLAD STEEL

Available in Sheets 8 to 18 gauge; in Plates 3/16" to 1¼". Let us give you estimate of costs for converting your old tanks into stainless equipment. No obligation. Address . . .



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Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

American Cyanamid Research Laboratories

Considerable progress in the application of scientific knowledge to pulp and papermaking has been made during the last few years, and the number of technical changes and improvements in the industry is increasing at an accelerated pace. No small part of this technical progress has resulted from the close collaboration between paper mills and the producers of chemical products and specialties.

"Cyanamid" long has been a believer in the value of research, and for a number of years has carried on an extensive program of research and development work at several of its larger plants. In 1936 a further step in advance was taken through consolidation of most research, development and service facilities into one group at what is known as the Stamford Research Laboratories. The purpose of the consolidation was not only to enlarge considerably the personnel and facilities available, but to effect a sound correlation of the chemical, physical, engineering and patent problems involved in each particular development.

Of Special Interest to Paper Makers

Of particular interest to pulp and papermakers are the wide variety of facilities and specially trained personnel which are available for attacking the most complicated technical problems involving the use of chemicals in the industry. Of course the entire facilities of the laboratory are not devoted to products and problems of the paper industry alone. The company's activities are so diverse that the research work in progress covers practically the entire chemical field, including certain aspects of natural products utilization, engineering development, and industrial processing.

A list of Cyanamid products includes such widely diversified materials as sodium sulphate, alums, sizes, casein, satin white, and other chemicals for the pulp and paper industry; chemicals for mining and metallurgy; fertilizers; insecticides and fumigants; serums, vaccines and pharmaceuticals; gypsum products such as plaster, tile, and precast roofs and ceilings; synthetic resins for plastics, paint and lacquer, and printing inks; dyestuffs and dye intermediates; commercial dynamite and blasting supplies; and chemicals for the rubber, textile, leather, metal products, food products, petroleum, and many other industries. From experimentation on such a wide number of chemical products there is derived one unique advantage which is of inestimable value in the prosecution of successful technical development in any one field. It is the availability of specialists in other fields who can contribute new angles and ideas to a problem.

Staff Numbers Over 300

The laboratory is located at Stamford, Conn., and is housed in a five-story modern brick building with a floor area of over 250,000 square feet, with ample room for expansion of the present staff, which numbers over 300. Additional facilities include a greenhouse for testing insecticides and fumigants, and other separate buildings for work with hazardous chemicals. The design of the laboratory and its operating set-up are such that a functional division of the work is possible in many instances. This facilitates an intensive concentration by the research chemists on the actual problem of developing new products and processes, rather than having to devote excessive time to supplementary work of less importance. For example, apparatus washing service is furnished on each floor, and efficient stores, shop, and business departments handle supplies, equipment repairs, purchasing, etc. Each main technical division has a centralized filing and stenographic department.

The technical work of the laboratory is divided into six principal divisions as follows: (1) Patent and Abstract, (2) Research, (3) Physics, (4) Technical Service, (5) Mining Chemicals, and (6) Chemical Engineering. The Patent and Abstract Department handles patent matters for the entire cor-

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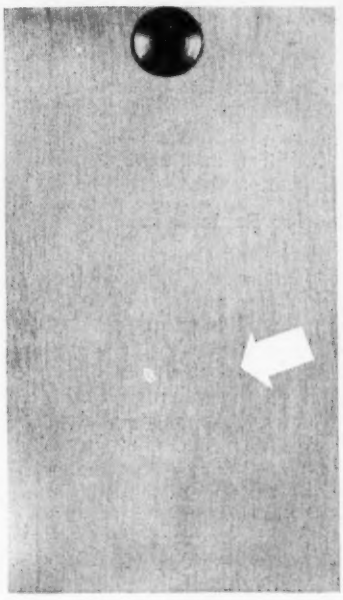

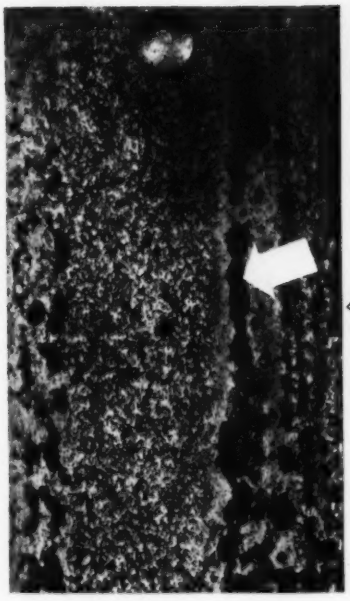

Look at the Difference!

These two similar pieces of metal, one slushed with GULF OILCOAT NO. 1 and the other with a conventional slushing compound, were exposed to highly corrosive influences for the same length of time. The superior value of GULF OILCOAT NO. 1 is clearly demonstrated by the perfect condition of the metal plate on the left.

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YOU can now secure an improved material to protect highly finished surfaces of steel and non-ferrous metal products against corrosion—GULF OILCOAT NO. 1. This product is an entirely new type of slushing compound, developed by Gulf technologists after many years of research and field tests.

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poration, and supplies information in the form of library facilities, abstracts of literature, and literature searches to all other divisions of the laboratory.

Research Division

The Research Division carries out pure and applied chemical and biological research applying to all company products and prospective new products. The Physics Division deals with the application of physics to the problems of the other divisions. Spectrographs, microscopes and physical testing instruments are its primary tools.

Technical Service Division

The Technical Service Division works principally on the development of application of products of research to customer requirements, and of course assists the Sales Department in the laboratory phases of technical sales service problems. It is divided into a number of sub-groups, each dealing with an important industry, such as the pulp and paper, heavy chemicals, textile, rubber, leather, insecticide, paint and lacquer, printing ink, metal trades, fertilizer, and synthetic plastics. The personnel of each group includes men with wide practical experience in their respective fields.

Chemical Engineering Division

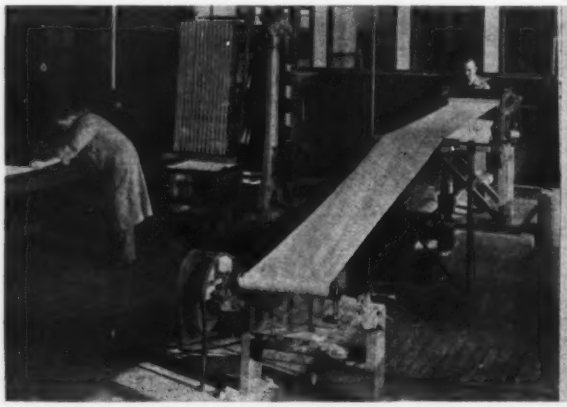
The Chemical Engineering Division translates "test tube" operations to a larger scale, by means of complete pilot plant facilities, and obtains data necessary for commercial plant and process design.

Special Facilities for Paper Work

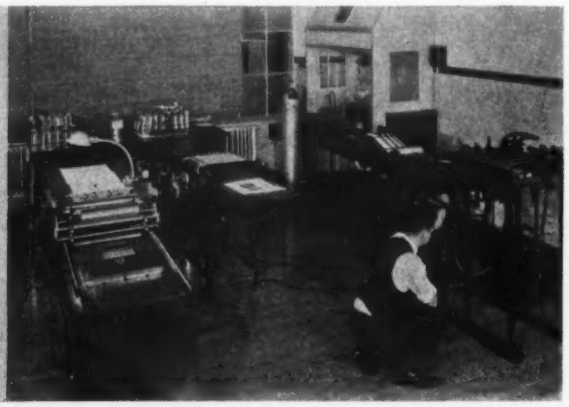
Certain types of work carried out at the laboratory are of particular interest to the paper industry, since the special facilities required are not always available in the normal paper mill laboratory. In the Physics Division is located a complete microscopical laboratory, which handles such work as photomicrography, chemical microscopy, identification of specks and spots, fiber analysis, study of pigment particle size, physical aspects of emulsions, and other interesting problems. Also are available a spectrophotometer for color analysis, and equipment for examination of substances for fluorescence under ultra violet light. A constant temperature and humidity test room houses most of the standard types of paper-testing instruments as used throughout the pulp and paper industry. Infra red and ultra violet spectroscopy are important tools in the study of the structure of new organic compounds. Minute traces of any metallic substance can be detected in many materials with the ultra violet spectroscope. New instruments for the measurement of various physical properties of paper have been designed and built.

Colloid Section

In the Colloid Section of the Research Laboratory an intensive research program is under way on the



SUPERCALENDER AND 20-INCH BRUSH COATER FOR SEMI-COMMERCIAL EVALUATION OF COATING MATERIALS.



PRINTING TEST EQUIPMENT—PRINTING PAPERS CAN BE EVALUATED UNDER ACTUAL USE CONDITIONS.

development of new types of emulsions that may be used for paper sizing and coating. In the main Analytical Laboratory even the most complex analyses are handled either on a macro or micro basis. In another laboratory of the Technical Service Division are available several types of commercial and test printing presses, enabling evaluation of paper properties in relation to printing results.

In the Paper Chemicals Laboratory are available complete facilities for the evaluation on a small scale of papermaking and paper coating raw materials and chemicals. A laboratory beater and special refiner enable treatment of stock in a manner comparable with paper mill operating conditions. Standard sheet-making equipment is used for comparison of sizes, fillers, and other materials which might impart valuable qualities to paper. Paper coating materials are dispersed and mixed in specially designed small-scale equipment, and applied to standard sheets of rawstock for subsequent testing. The laboratory coating equipment is supplemented by a semi-commercial coating set-up consisting of a 20 inch brush coater and a 28 inch five-roll sheet supercalender.

The American Cyanamid Company, together with many other chemical manufacturers, has recognized the important place that pulp and papermaking occupies among American industries. The considerable investment of men and money in developments relating to the paper industry, at its Stamford Laboratories, is evidence of the desire to be of service in contributing to further progress in the efficient manufacture and utilization of pulp and paper products.

F. J. Borland Goes with Orange Paper Co.

HERRINGS, N. Y., January 8, 1940—Floyd J. Borland, who resigned as superintendent of the local branch of the Taggart Paper Company, several months ago, has accepted a similar position with the Orange Paper Company, Orange, Tex. He will leave here immediately to take over the duties of his new position. For many years he was employed by the St. Regis Paper Company and served in the branch plants at Herrings and West Carthage, the latter being the mill of the old Champion Paper Company. It is understood that he will serve as superintendent of the new kraft paper mill of the Texas concern. During his connection with the industry in this section he made many friends who feel that he will be successful in his new venture.

W. W. Galloway with Bauer Bros.

W. W. Galloway is now sales manager of the Pulp and Paper Division of the Bauer Brothers Company, Springfield, Ohio. Mr. Galloway was formerly treasurer and general manager of the Hagar Straw Board and Paper Company of Cedarville, Ohio. He has been associated with the company since last July. Mr. Galloway has been a member of the Technical Association of the Pulp and Paper Industry for a number of years.

The year which has just closed shows an increase of 40.1 per cent of sales in this division over 1938. Bauer Brothers' machines are being adapted to new processes and additional machines are in process of being developed to increase the company's sales and service.

Cincinnati Cordage Holds Conference

The Cincinnati Cordage and Paper Company held a sales conference at the Netherland Plaza Hotel, in Cincinnati, Wednesday, December 27. All officers, directors and salesmen of the company were in attendance, some 45 in all. During the afternoon we were addressed by Clarence Hodlmair, of the Nekoosa-Edwards Paper Company, who represents the Coarse Paper Division, and Lee Turley of the Nekoosa-Edwards Paper Company, who is their sales promotion manager, outlining new developments and plans for 1940. Opportunity was also given for various salesmen to tell of unusual or outstanding business which they had secured during the past year, so that much benefit was derived by all in attendance through this exchange of ideas.

E. F. Evans, secretary, presided at the Coarse Paper Meeting during the afternoon. R. G. Evans, treasurer, presided at the Fine Line Meeting during the afternoon.

Following a very fine banquet, Don Nesbitt, vice-president, presided as toast master for the evening meeting. Joe Schatz, of Cincinnati, who has served the company for 28 years, gave a beautiful tribute to the memory of the past officers and directors.

John F. Church, vice-president of the company, then presented the awards which had been announced for outstanding achievement in selling on the part of the various salesmen during the year. Mr. Church, whose father and brother, have spent their entire business life serving this company, gave a most inspiring tribute to the company. A. T. Nesbitt, president, gave a most inspiring address, of which the theme was "Good Will Toward One Another, Toward Our Friends and Customers." He also gave a very interesting history of some of the early days of the company.

Following his address, Professor Frank D. Slutz, nationally known lecturer and educator, gave a fine address on the subject—"A Vital Inventory."

Government Paper Bids

WASHINGTON, D. C., January 10, 1940—The Government Printing Office has received the following bids for 6,250 pounds (50,000 sheets) of 50 per cent rag, 20 x 25 blue antique paper; R. P. Andrews Paper Company, 10.27 cents; Whitaker Paper Company, 10.48 cents; Perkins-Goodwin Company, 12.95 cents; Virginia Paper Company, 11 cents; Mudge Paper Company, 9.85 cents; Barton, Duer & Koch Paper Company, 10.39 cents; Stanford Paper Company, 10.49 cents; and Walker, Goulard Plehn Company, 12.5 cents.

For 6,000 pounds of 24 x 36 plate wiping paper; R. P. Andrews Paper Company, 7.7 cents; and Barton, Duer & Koch Paper Company, 8.75 cents.

For 21,056 pounds (752,000 sheets) of 50 per cent rag, 10½ x 16 white M.F. lithograph paper; Aetna Paper Company, 9.51 cents; Mudge Paper Company, 9.73 cents; R. P. Andrews Paper Company, 9.43 cents; Whitaker Paper Company, 12.17 cents; Graham Paper Company, 10.42 cents; Paper Corp. of U. S., 10.99 cents; Old Dominion Paper Company, 9.747 cents; and Mathers-Lamm Paper Company, 13.5 cents.

For 589 pounds (6,300 sheets) of 50 per cent rag, 38 x 42 yellow bond paper; Barton, Duer & Koch Paper Company, 24 cents.

Bathurst Completes Improvements

The result of the policy of improvement adopted by the Bathurst Power and Paper Company is now clearly evident, according to the *Gloucester Northern Light* of Bathurst, N. B. Not only are they producing a range of four different products, but the past year has seen the greatest volume of production since the industry was established in 1915 and quality has been attained that makes and holds markets formerly unavailable, and in addition, and this is perhaps the best part of it, the plant has been brought to such a high point of modern efficiency that operations in future are certain to be profitable. The improvement program included the following:—

The installation of a Tomlinson recovery plant to replace the older and less efficient equipment in the kraft recovery plant.

Installation of four new kraft digesters, which are of welded design and do not require the brick linings of the old type. These digesters, besides avoiding the disadvantage of having chips of brick and sand affect the product, are of larger capacity thus making increased production possible when required.

Installation of five new Swenson evaporators where the liquor from the digesters will be concentrated.

The modern equipment mentioned above required the erection of a brick, concrete and steel addition to the mill property approximately 60 feet square, five stories high and the removal of the old digesters, several steam furnaces and other alterations, which were all accomplished without affecting the normal production of the plant.

All the activities above mentioned added to the regular operation of the mill at full capacity provided an outlet for employment that raised the company's payroll to the highest point in its history.

Gratifying and satisfactory to Bathurst and its people as the regular operations and the improvements undertaken have been, it is even more satisfactory and pleasing to read the statement recently issued by R. L. Weldon, the president of the Bathurst Company, which points out that the company has experienced a sharp improvement in business since September 1. J. G. Chalmers is mill manager of the company.

Herty Institute Planned

A movement to establish the Herty Forest Institute at Waycross, Ga., in tribute to the work of the late Dr. Charles H. Herty in establishing the paper and pulp industry in the Southern states, was started at a meeting held by a group of Dr. Herty's friends at Savannah, Ga., on January 4.

Patron funds will be sought from friends and beneficiaries of Dr. Herty's work which has resulted in the establishment of many large pulp and paper mills in the South in the past few years. An option has been secured on a suitable building to house exhibits of the naval stores industry, paper mills, lumber industry, federal and state agencies, transportation, etc. It is also planned to establish demonstration forests along the main highways in the Southern pine belt, to be identified as "Herty Demonstration Forests." It was stated that nine such forests are now available. It is estimated that a minimum of $50,000 will be required and the institute is expected to be sustained by nominal membership dues.

Introduces Four New Papers

For nearly 100 years the L. L. Brown Paper Company, of Adams, Mass., has specialized in the manufacture of permanent record papers, principally for government records, but also used extensively for the more important commercial requirements as well. Conspicuous among its products in this respect is L. L. Brown's Linen Ledger, the company's 100 per cent rag Extra No. 1 ledger grade made from new white linen and cotton cuttings.

To meet changing conditions of use, that company has now broadened its service to embrace the secondary 100 per cent rag and the 50 per cent rag grades. In each of these grade levels, it has brought out a new ledger and a new bond, thus making four additional L. L. Brown papers. The 100 per cent grades are known as Forward Linen Ledger and Forward Bond, while the 50 per cent grades are designated as Escort Ledger and Machine Posting and Escort Bond.

In announcing this development, Mr. A. Millard Daniels, President of the company, states that the move was made at the suggestion of leading paper merchants, printers and consumers. These representative users of paper had pointed to the increased wear and tear to which records are subjected today and explained the need of papers designed especially to meet such requirements.

Acting upon the recommendation, the company made an extensive study of the market. This was supplemented by equally wide research to discover how the company's formulas, representing some 90 years of specialization, might be adjusted to obtain the desired qualities in the lower grade ledgers and bonds. The result was an addition to the formulas which, it is stated, makes it possible to minimize certain destructive factors which hitherto have always detracted from the serviceability of non-permanent papers.

The names chosen for the new lines are described as being significant. The word "Forward" was selected to represent the progressive step which has been taken in extending L. L. Brown service. The name "Escort" was chosen to emphasize the fact that the new papers are worthy companions to the older grades which have made the company's products well known for several generations.

Dr. Hauck to Address NPTA

The National Paper Trade Association will hold its 37th Annual Convention at the Waldorf Astoria Hotel, New York, on February 19 to 22, with the usual exhibits of papers and allied lines.

The principal speaker at the opening of the general session will be Dr. Arthur A. Hauck, president of the University of Maine, an institution well known for its accomplishments and technical facilities in the paper and pulp industry. All members of the paper industry are invited to attend.

Another prominent guest speaker expected is Sam Vining, executive of the Westinghouse Electric and Manufacturing Company, one of the best known and successful sales directors. It is also the hope of the association to have a speaker from the Department of Commerce Committee, recently formed for the purpose of studying and eliminating interstate trade barriers, which object is of great importance to many members of the association.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for the Week Ending January 10, 1940

	High	Low	Last
A. P. W.	3¼	3¼	3¼
Armstrong Cork Co.	40⅜	39½	40⅜
Celotex Corp.	11⅛	10⅜	10⅞
Certain-Teed Products Corp.	7¼	6¾	6¾
Certain-Teed Products Corp., pf.	31¾	29¼	30¼
Champion Paper & Fibre Co.	26½	26	26
Champion Paper & Fibre Co., pf.	104	102	102
Congoleum-Nairn Co.	24¼	23⅜	23⅜
Container Corp. of America	17	16⅛	16¼
Continental-Diamond Fibre Co.	7⅜	6¾	6¾
Crown-Zellerbach Co.	17⅛	16	16⅛
Crown-Zellerbach Co., pf.	92¾	90⅞	92
Flintkote Co.	20¾	19¾	20
Robert Gair	3⅞	3½	3½
Robert Gair, pf.	17	16½	17
International Paper & Power	14⅛	13⅛	13⅛
International Paper & Power, pf.	57	53½	54⅛
Johns-Manville Corp.	77½	74	74
Kimberly Clark Corp.	39	35½	36¼
Masonite Corp.	40⅞	38¼	39¼
Mead Corp.	11⅝	11	11
Paraffine Companies, Inc.	42	42	42
Rayonier, Inc.	19⅛	18½	18½
Rayonier, Inc., pf.	28¾	28	28
Ruberoid Co.	20⅜	19⅛	19⅛
Scott Paper Co.	49	48	48
Scott Paper Co., pf.	114¾	114	114¾
Sutherland Paper Co.	29	29	29
Union Bag & Paper Corp.	14⅞	13¾	14⅜
United Paperboard Co.	5⅞	5⅜	5⅜
U. S. Gypsum Co.	87½	84¾	86
U. S. Gypsum Co., pf.	179	178	179

New York Curb Exchange

High, Low and Last for the Week Ending January 10, 1940

	High	Low	Last
American Box Board Co.	7	7	7
Brown Co., pf.	27½	26	26
Great Northern Paper	46	44¾	46
St. Regis Paper Co.	3⅜	3	3
St. Regis Paper Co., pf.	61	58	61
Taggart Corp.	5⅞	5⅝	5¾

Fox River Sales Increased

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 8, 1940—Substantial production and sales gains are reported by the Fox River Paper Corporation of Appleton for the year 1939. Since the fall of 1938, the mills have been under the management of new owners, with E. A. Oberweiser as president. New and improved papers, mostly in the rag content field, have been developed under the "Masterline" trade-mark, and their reception has been universal by the jobbing trade.

Payrolls for 1939 exceeded those of 1938 by 20 per cent, matched by a corresponding increase in production. Numerous changes and improvements were made in the paper machines and other equipment during the year, resulting in a higher efficiency. The laboratory facilities and personnel were enlarged. An extensive promotional campaign was carried on to bring the Masterline brands into the trade limelight, and their sale and use is now generally established.

The following statement on the business outlook has been issued by company officials:

"While the corporation anticipates a slightly increased level of business in 1940, it is neither anticipating a run-away market nor maximum volume. The September-October flurry of buying is now dissipated, and recent orders have been on a more normal level, although a reasonable backlog of orders still exists.

"It is the opinion of the officials of this company that any large increase in sales will come only from increased promotional effort and the maintenance of high quality standards, while the considerable increase in raw material prices has put a premium on efficient production."

Paper Co. Profits Rise

WASHINGTON, January 8, 1940—A combined profit after all charges of $28,000,000, or 8.2 per cent of sales, was made by twenty-two of the most important producers of paper and allied products in 1937, compared with $19,000,000, or 6.3 per cent of sales, in 1936, the Securities and Exchange Commission reported today in another of its reports on the survey of American listed corporations conducted in conjunction with the Works Projects Administration.

In 1935 these twenty-two concerns had combined profit after all charges of $7,400,000, or 2.9 per cent of sales, and in 1934 $6,600,000, or 2.9 per cent of sales.

Palmer Paper Box Chartered

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., January 8, 1940—A federal charter has been granted Palmer Paper Boxes, with a capital stock consisting of 50,000 shares without nominal or par value. The head office of the company is in Toronto and, among the provisional incorporators, are James E. Lawson and David J. Ongley, of Toronto. The company is given power to buy, sell and deal in all kinds of board and paper, and to make boxes, bags, packages, as well as machinery for making all kinds of corrugated paper, etc.

Power Plant Bonds Sold

APPLETON, Wis., January 8, 1940—Bonds totalling $140,000 to finance the new power plant of the City of Kaukauna, Wis., now under construction at the water power site of the former Patten Paper Company mill, have been sold to the Milwaukee Company, Milwaukee, Wis. The price was $138,810. The issue carried a rate of one and a half per cent interest, and will be retired at the rate of $14,000 per year.

A. F. Torbeck Succeeds E. H. Shields

E. H. Shields, treasurer of the Chatfield Paper Corporation and The Chatfield & Woods Company, died December 15, 1939. Mr. Shields was connected with the company in the above capacity since 1906.

A. F. Torbeck, formerly credit manager, has been elected director and treasurer. Mr. Torbeck has been with the company since 1910.

Indiana Fibre Reorganized

INDIANAPOLIS, Ind., January 8, 1940—Articles have been filed with the Indiana secretary of state showing the reorganization of the Indiana Fibre Products Company, Marion, Ind., with 10,000 shares of common stock having no declared par value. The name of the corporation has been changed to the Bell Fibre Products Corporation.

CONSTRUCTION NEWS

Georgetown, S. C.—The Southern Kraft Corporation, 220 East 42nd street, New York, N. Y., manufacturer of kraft papers, container board, etc., has approved plans for expansion and improvements in branch mills at Georgetown and Springhill, La., both projects to be carried out at once. Work will include new production units and installation of machinery in pulp and paper mills at both plants. Present capacity at the two mills will be increased by 330 tons per day, or on a basis of approximately 110,550 tons per annum, divided between both plants. Program is scheduled for completion next April and will represent a gross cost of about $660,000, including machinery.

Emeryville, Cal. — The Paraffine Companies, Inc., 475 Brannan Street, San Francisco, Cal., manufacturer of building papers, composition roofing, tube chip and allied products, has approved plans for new addition to branch plant at Emeryville, to be one-story, reported to cost over $60,000, with equipment. Bids have been asked on general erection contract and work is scheduled to be placed under way soon. Leland S. Rosener, 223 Sansome street, San Francisco, is engineer.

Elizabeth, N. J.—Peter J. Schweitzer, Inc., 994 Newark avenue, manufacturer of manifold, carbon, bible and other paper stocks, has engaged William E. Lehman, 972 Broad street, Newark, N. J., architect, to prepare plans for new addition to plant, forming first unit of proposed expansion program recently noted in these columns. It will be one-story and basement, about 90 x 150 feet, reported to cost close to $100,000, including equipment. It is proposed to ask bids on general erection in near future. Company is affiliated with Papeteries de Malaucene, Lyons, France.

Green Bay, Wis.—The Hoberg Paper Mills, Inc., manufacturers of tissue and other paper stocks, has approved plans for new addition at local Division B mill, for expansion in storage department. New unit will be one-story type, designed for ground-wood service, with series of storage tanks. Erection will be placed under way at once. Cost is reported at close to $25,000, including equipment.

East Walpole, Mass.—Bird & Son, Inc., manufacturer of wall board, press board, building papers and kindred stocks, has completed plans for new addition to main mill at East Walpole for considerable increase in present capacity. It will be one-story, 30 x 500 feet, reported to cost over $100,000, with equipment. Contract for erection has been awarded to MacDonald & Belvin, Inc., 88 Broad street, Boston, Mass., and work will be placed under way at once. Completion is scheduled early in the spring. An award for structural steel framing has been let to the New England Structural Steel Company, 310 Second street, Everett, Mass. As recently noted in these columns, company has work under way on new one-story addition to storage and distributing building at Phillipsdale, R. I., to be 70 x 140 feet, estimated to cost close to $45,000, including equipment. The A. F. Smiley Construction Company, 308 Main street, Pawtucket, R. I., is contractor for the last noted structure.

Waynesboro, Va.—E. I. duPont deNemours & Co., Inc., duPont Building, Wilmington, Del., Rayon Division, has plans for expansion and improvements in branch mill at Waynesboro, including new additions and installation of machinery for increased capacity. A one-story storage and distributing building also will be erected. Cost reported close to $100,000, with equipment. Work will be placed under way at early date. A. W. Frame is manager at local mill, which is used for production of acetate rayon materials.

New Haven, Conn.—The National Folding Box Company, James and Alton streets, manufacturer of folding box board and other paper board products, has taken out a permit for new addition to mill, to be one-story, 60 x 100 feet, reported to cost over $30,000, with equipment. It will be used for expansion in stock house on James street. Erection contract has been let to the Porcupine Company, Fairfield, Conn., and work is scheduled to proceed at once.

Lisbon Falls, Me.—The United States Gypsum Company, 300 West Adams street, Chicago, Ill., manufacturer of wall board, wood pulp insulating board, etc., has completed plans for new addition to branch mill at Lisbon Falls, used for last noted branch of manufacture. It will be one-story, used primarily for storage and distribution, and is estimated to cost about $35,000, including equipment. Bids have been asked on general erection contract and work will be placed under way soon.

Middletown, Ohio—The Inland Container Corporation, manufacturer of corrugated boxes and containers, has superstructure in progress on new addition to local mill on Nelbar street, recently referred to in these columns, and will push to completion at earliest date. It will be one-story, 140 x 200 feet, estimated to cost over $60,000, with equipment. The Austin Company, 16112 Euclid avenue, Cleveland, Ohio, has the general contract for erection. Main offices of company are at 700 West Morris street, Indianapolis, Ind.

Hamilton, Ont.—Kraft Containers, Ltd., Cavell avenue, manufacturer of paper boxes and containers, etc., has plans under way for new one-story addition, reported to cost close to $50,000, with equipment. It is understood that work will begin early in the spring. H. S. Littlejohn is general manager.

New Incorporations, Etc.

Brooklyn, N. Y.—The Standard Holloware Corporation has been incorporated as an interest of the Standard Fibre Specialty Corporation, 92-98 Bogart street, Brooklyn, to manufacture fiber products of various kinds.

Boston, Mass.—The New England Wallpaper Company, 17 Kneeland street, has been organized with capital of $5000, to deal in wallpaper stocks. Edward A. McCarthy is president and treasurer.

Windsor, Conn. — The Taylor Atkins Paper Mills, Inc., Windsor, has filed notice of company dissolution under state laws.

Milwaukee, Wis.—Papercraft, Inc., Milwaukee, has been organized to manufacture and deal in paper products. The incorporators include Carl E. Buege,

Joseph P. Pepan and Harry Reynolds, Milwaukee. New company is represented by D. C. Monte, 750 North Milwaukee street, Milwaukee, attorney.

Wilmington, Del.—The Crook Paper Box Company has been chartered in Delaware under direction of the Corporation Trust Company, Industrial Trust Building, Wilmington, with capital of $100,000, to manufacture and deal in paper boxes and containers. Incorporators include R. F. Lewis and L. H. Herman.

Glencoe, Ill.—The Samson Plaster Board Company, Inc., has been incorporated under Delaware laws with capital of $10,000, to manufacture and deal in gypsum wall board, paper board and kindred products. The incorporators include Charles M. Price, Glencoe; and Clifford C. Pratt, Hinsdale, Ill.

Indianapolis Expresses Confidence

[FROM OUR REGULAR CORRESPONDENT]

INDANAPOLIS, Ind., January 9, 1940—Even though the paper business in this section did a nosedive the last week, jobbers and manufacturers are looking with confidence toward the next quarter. Thus far the local jobbing trade has had no difficulty in securing shipments, but many are expecting some higher prices on better grades of paper the first quarter. Even then they do not expect any shortage of any nature. Stocks of fine paper are rather low in local warehouses, due largely to inventory period and not because any slump is expected in business.

Taken as a whole the past year has been considerably better than the year before in all lines. The real change for the better came during the early summer when summer specialties stimulated volume. The early fall began good and when trouble started in Europe there was a noticeable increase in volume of all kinds. Since that time prices have become firmer, though as yet there is no hint of a run-away market.

Following the general trend, and due to seasonal influences, demand for building paper is at a low ebb and is expected to remain so until shortly before the start of the spring season. The last year, however, saw volume bound so it compares favorably with peak years. Retail stocks are low, but well balanced, according to local factory representatives.

Demand for newsprint continues fair due largely to increased advertising on the part of domestic advertisers. The trade is expecting a slump, however, by the middle of the month, when most of the holiday clearance sales have been completed.

Container factories, for the most part, are taking inventory and production is at a low ebb. They report a good volume for the last year and are confident of the first quarter. Here, too, warehouse stocks are low but no effort will be made to augment them until the trade trend is more definitely established.

The paper stock and rag market was slow last week with prices generally weak on all grades.

Becomes Butler Paper Co.

MINNEAPOLIS, Minn., January 8, 1940—The McClellan Paper Company, Minneapolis wholesale paper house established 43 years ago, has changed its name to the Butler Paper Company, according to W. J. Plant, vice president and general manager. This is one step in a program for expansion of sales and distribution facilities, Mr. Plant said. The Butler Paper Company will open a branch house in St. Paul, at 2341 University avenue. Headquarters will continue in Minneapolis.

BENEFIT BY PULP SCARCITY

(Continued from page 9)

be taken and for the protection of the growing stock that must be left."

$8,000 Fire at Southern Kraft Mill

Losses estimated at $8,000 to $10,000 were sustained by the Southern Kraft Corporation, Marinette, Wis., in a fire January 3. Two stacks of wood pulp 25 feet high were ignited, presumably from sparks from a yard crane. The flames ate deeply into the piles despite the use of cranes to give firemen access to the seat of the fire. Freezing weather made the extinction difficult, requiring seven hours. The pulp represented several hundred tons imported from Finland and Sweden.

Thilmany First in Safety Contest

Thilmany Pulp and Paper Company, Kaukauna, Wis., placed first among 31 mills in the United States and Canada for the first five months of the 1939-40 safety contest, according to a report of the National Safety Council. The upper mill was included in the group averaging between 60,000 and 100,000 man hours per month, and worked 472,624 man hours from July 1 to November 30 with but one lost-time accident for a frequency rate of 2.12, based on the number of lost-time accidents per million man hours. The company's lower mill is in Eighth place, according to L. C. Smith, personnel director.

Marathon to Increase Sawmill Output

Marathon Paper Mills Company is doubling the operations of its sawmill at Ironwood, Mich., for the year 1940, according to John Langdon, manager of the mill. The company plans to saw 8,000,000 feet of logs this season. It will employ 125 men, operating on two shifts per day.

Whiting-Stevens Nuptials

Frank B. Whiting, Menasha, Wis., president of the George A. Whiting Paper Company of Menasha, and the Whiting-Plover Paper Company, Stevens Point, Wis., and Miss Merle Stevens of New York City, were married January 3 at Dubuque, Iowa. The couple had previously announced the wedding for January 6 at the Whiting boathouse at Neenah, Wis., but when 45 friends gathered there they were informed of the ceremonies at Dubuque. The bride has been a radio and concert singer in London and New York. Mr. and Mrs. Whiting will leave in February to spend their honeymoon in Honolulu.

Daughter of F. E. Sensenbrenner Engaged

F. E. Sensenbrenner, assistant secretary-treasurer of Kimberly-Clark Corporation, Neenah, Wis., and Mrs. Sensenbrenner have announced the engagement of their daughter, Marjorie, to H. Graham Brownson of Portland, Ore. Mr. Brownson is a graduate of Harvard Law School and is an attorney at Portland.

Fort Edward Papermakers Elect Officers

FORT EDWARD, N. Y., January 8, 1940—J. Raymond Caples was elected president of the local branch of the International Brotherhood of Papermakers at a meeting here this week. Other officers elected included Calvin W. Barker, vice president; Edward T. Burns, recording secretary; William T. Corriveau, financial secretary, and Ernest H. Wood, treasurer.

PAPER TRADE JOURNAL
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COMING EVENTS IN PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixty-third Annual Convention and meeting, Waldorf-Astoria Hotel, New York. February 19-22.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Roosevelt Hotel, February 19-22.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 20.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel. New York. February 19-22.

NEW YORK ASSOCIATION OF DEALERS IN PAPER MILLS' SUPPLIES. Annual Banquet, Hotel Commodore, New York, February 20.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

LABOR ACT REVISION

With the National Association of Manufacturers, the United States Chamber of Commerce, the American Federation of Labor, and the Congress of Industrial Organizations, recommending amendments to the National Labor Relations Act, an influential unanimity demands improvement in the present law. While all these organizations have proposed amendments there exist many differences in their recommendations.

The National Association of Manufacturers has urged four amendments. (1) Safeguards for employers, through a specific statement guaranteeing employers' rights to free speech in labor matters, through making Board facilities available to an employer who is confronted with conflicting demands by rival unions, through prohibitions on illegal strikes.

(2) Safeguards for employees, through prohibitions of coercion from union as well as employer, through prohibition of closed shop and check-off in union agreements, through ending majority rule or providing protection for employees who do not wish to join a majority union.

(3) Regulation of unions, through limitation of rights to strike and through requiring registration of unions which seek bargaining privileges.

(4) Procedural changes, through requirement that complaining party have the burden of substantiating charges, and through a prohibition on certification of bargaining units including employees of more than one employer.

The United States Chamber of Commerce has recommended the first two of the above proposed amendments and has further proposed that the triple functions of the Labor Board, investigating, prosecuting and judging, should be segregated to enable each department to operate independently, and that the Board be required to judge each case in the light of public interest.

The American Federation of Labor has asked Congress to provide a new five-man Board to administer the Act. It requests protection for craft unions, freer court review of the Labor Board's actions, the aid of the Board to an employer confronted with rival labor unions, and a prohibition on Board certification of bargaining units covering employees or more than one plant of an employer, where the majority in any plant objects.

The Congress of Industrial Organizations opposes the amendments advocated by the American Federation of Labor and would provide (1) Criminal penalties for employers found to have violated the Act, (2) Blacklist employers held to have violated the Act from receiving Government business, and (3) Protect the industrial unions from being "carved up" by craft unions.

From the attacks made on the Labor Board, particularly in its interpretation of the law, changes in the Wagner Act appear more certain to provide relief for employers. Representative Robert Ramspeck, Democrat of Georgia, and an influential member of the House Labor Committee, has urged the removal of Chairman J. Warren Madden and Member Edwin S. Smith from the Board as the first step in restoring confidence in the National Labor Relations Board. Mr. Ramspeck advocates an amendment to permit employers to petition for collective bargaining elections, and another amendment to curb the power of the Board over the appropriate unit for bargaining. In a recent radio address, Representative Howard W. Smith, chairman of the Special House Committee investigating the National Labor Relations Board, stated that if Congress would amend the Act and the Board would administer it to protect an employee from coercion of any kind, from any source, "we will have accomplished in a large measure the purpose designed by Congress."

In reopening its hearings last week, the Special House Committee has stated that it will summon four National Labor Relations Board review attorneys, presumably to inquire about the work of the much criticized review division of the Board, which prepares decisions for the signature of the three board members. It had been expected that Congress would take up four of the more important charges against the Board: (1) Alleged failure of the Board to grant fair and judicial hearing in several cases, one of which involved the Inland Steel Company. (2) Alleged participation of Board Member Edwin S. Smith in a union boycott campaign against the Berkshire

Hosiery Mills, against which subsequent Board proceedings were directed. (3) Alleged incompetence of Board Secretary Nathan Witt, whose duties are similar to that of general manager, and (4) Alleged partiality of the Board to the industrial form of unions as represented by the CIO and against employers.

The regular House Committee on Labor is expected to soon complete a report on Labor Act hearings and is drafting amendments to the Act for recommendation to Congress. These amendments are expected to provide for the elimination of Chairman Madden and Member Smith; to permit employers to secure collective bargaining elections to determine union preference of their employees, and to provide a limitation on the Board's power to determine what group of employees shall constitute a bargaining unit. In recent court decisions the rights of the employer were recognized to discharge a union employee for any reason or for no reason, provided the employee was not discharged for union activities. Another decision by the Circuit Court at Chicago refused to enforce a Labor Board order against C. G. Conn, Limited, to reinstate with back pay four employees discharged during an alleged slow-down strike. The court held that, "We are aware of no law or logic that gives the employee the right to work upon terms prescribed solely by him."

Tie Bids in Paper Industry

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 10, 1940—Report has been made to TNEC regarding identical bids received by the Government during the twelve month period, December 1937 to November 1938. Report is by the Procurement Division of the Treasury Department and it indicates that identical bids were received on nearly a quarter of the items on which bids were opened by the Federal Government in that twelve month period.

The report shows that in the paper industry and its allied products 719 identical bids were received which was 2.8 per cent of all the paper bids received.

The material in the report was derived after an analysis of data received from 45 Federal agencies with respect to tie bids and other monopolistic practices encountered in Government purchasing.

Want Fiber Milk Containers

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., January 8, 1940—A letter to Governor Leverett Saltonstall from Representative Michael Paul Feeney of Hyde Park on January 5 asked that he call the Legislature into special session to revise the milk laws so that fiber containers may be used for milk and thus save the consumer 1½ cents on a quart.

Feeney said that fiber containers are used in New York and the price of milk has been reduced. The reduction, he said, has been achieved without "disturbing in the slightest degree the economic balances between the farmer and the milk companies."

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1939	1938	1937	1936	1935	1934
January	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	88.7%	76.3%	78.6%	80.5%	71.9%	58.2%
October	96.6%	82.5%	73.5%	87.6%	75.6%	64.7%
November	97.2%	79.6%	61.9%	88.0%	75.3%	61.7%
December	92.7%	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	84.9%	72.3%	80.6%	81.3%	70.5%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1939		CORRESPONDING WEEKS, 1938	
November 25	96.2%	November 26	74.4%
December 2	95.2%	December 3	78.8%
December 9	96.7%	December 10	77.6%
December 16	97.6%	December 17	81.3%
December 23	94.7%	December 24	75.9%
December 30	73.9%	December 31	62.8%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Nov. 25, 1939	Dec. 2, 1939	Dec. 9, 1939	Dec. 16, 1939	Dec. 23, 1939	Dec. 30, 1939
0% to 50%	38	42	33	35	25	39
51% to 100%	265	258	263	247	245	121
Total Mills Reporting	303	300	296	282	270	160

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1935	62%	68%	68%	63%	61%	66%	62%
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1935	67%	71%	77%	71%	61%	66%
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	63%	59%	61%
1939	72%	74%	74%	81%	....	....

Week end. Nov. 25, 1939—78%
Week end. Dec. 2, 1939—78%
Week end. Dec. 9, 1939—79%
Week end. Dec. 16, 1939—79%
Week end. Dec. 23, 1939—81%
Week end. Dec. 30, 1939—46%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

Winthrop L. Carter Speaks

BOSTON, Mass., January 8, 1940—Winthrop L. Carter, president and general manager of the Nashua Gummed and Coated Paper Company, Nashua, N. H., was one of the speakers at a luncheon meeting Friday of the first New England Sales Management Conference, held at the Hotel Statler January 5 and 6.

Permeating the sessions was an air of confidence in 1940 as a period of greater prosperity and business expansion.

Sponsored by the Boston Chamber of Commerce, the Conference was organized by the Sales Managers Club, Executives Club and the Bureau of Commercial and Industrial Affairs. Among the aims of the Conference are: To give New England sales executives opportunities to hear and discuss sound, enlightened and tested sales principles, fitted to the changing character of today's business and to assist New England sales executives to do their share in improving business in New England.

They Started Something!

WHEN William Caxton set up the first printing press in England he started something. At the time, the event did not cause even a ripple of interest outside a few scholarly circles. But in the light of history the results are breath-taking!

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

The Chemistry of Lignin

II. The Butanolysis of Wood

By A. J. Bailey[1]

Abstract

Further studies in the use of butanol in pulping wood showed that 2 per cent of alkali added to the butanol-water mixtures accelerated the delignification from 5 to 16 times. Using this type of liquor, almost white pulps containing only ⅓ per cent of lignin were obtained in yields of 43 to 50 per cent, by cooking aspen for 15 minutes and jack pine for 1 hour. Time-yield-alkali-lignin content curves are shown for the entire practicable range for the pressure used. It is shown that the alkali functions chiefly as a catalyst in the lignin-butanol condensation rather than as a reactant. A theory of the mechanism of butanol pulping is offered and supporting experimental evidence pointed out. Butanol was easily recovered from the final liquor, 95 per cent being recovered by separating the immiscible layer and several per cent more by distilling only 10 per cent of the total liquor.

Organic reagents are potential competitors of present commercial pulping agents, all of them inorganic. Possible advantages include reduced pulping time, higher yields, and utilization of the chief waste product, lignin.

In recent years, considerable attention has been given to the delignification of wood by various aliphatic and aromatic alcohols. Phillips *(15)* cites fourteen reports of work with ethanol. Methanol was used by Brauns and Hibbert *(3)* and Aronovsky and Gortner *(1)*. Propyl, butyl, amyl, and their iso-alcohols have also been used *(1, 7)*. Other hydroxylic compounds used include ethylene glycol *(3, 9, 11, 16, 17)* glycerol *(16)*, the monomethyl ether of ethylene glycol *(6, 9)*, glycerol alpha-monochlorohydrin *(4, 5, 10, 12, 13, 14, 21)* and others *(8, 19, 20)*.

A comprehensive investigation, from the standpoint of pulping, was made by Aronovsky and Gortner who surveyed the pulping possibilities of a number of hydroxylic reagents and demonstrated the superiority of *n*-butyl alcohol over others. In another place further data were reported on another phase of butanol pulping *(2)*.

Experimental Methods

To learn the fundamental aspects of butanol pulping the delignification process was studied further under various conditions. Samples of wood consisted of a mixture of sapwood and heartwood of aspen *(Populus tremuloides* Michaux*)* and heartwood of jack pine *(Pinus banksiana* Lambert). Samples for analysis were prepared by reducing the wood to sawdust and grinding it in a Wiley mill so that the entire sample passed through a 40-mesh screen. All weights were determined by drying to constant weight at 105 deg. C. Similar precautions were exercized in regard to the purity of reagents as were observed earlier *(2)*. Pressure digestion procedure and equipment were also the same *(ibid.)*.

It appeared desirable to learn the extent of delignification by butanol at atmospheric pressure. Samples were extracted in a Soxhlet apparatus using alcohol-benzene (1:2), water, and butanol in three successive, 4-hr. extractions. The results appear in Table I.

TABLE I—EXTRACTIVES AT ATMOSPHERIC PRESSURE

	Aspen Per cent	Pine Per cent
Alcohol-benzene	3.38	5.54
Hot water	1.96	2.46
Butanol	0.26	0.53

Since the delignification by butanol at atmospheric pressure was too low to have any industrial significance, cooks were carried out for various times and in the presence of various reagents to determine the approximate difficulties and problems commercial digestion could expect. Pressure digestions were carried out in a bronze autoclave of 2-l. capacity, equipped with a thermometer well and a combination pressure gage and gas regulator which controlled the burner to maintain constant temperature. After adding the sample and reagents to the autoclave, it was sealed and brought up to pressure (132 lb. per sq. in., 158 deg. C.) by heating with gas burners. After bringing up to pressure, it was maintained there for the required length of time, i.e., 4 hr. for a '4-hr. cook', and then allowed to cool to atmospheric pressure without releasing vapor. The residue was filtered on a Büchner funnel and washed. After setting the liquor aside for analysis, the residue was freed from the last traces of liquor and degradation products by suitable reagents, dried at 105 deg. C. weighed, and ground in a mortar for analysis. Some of the more important data of digestion are presented in Table II.

As will be noted, the yield and lignin content of the aspen residue was of an order meeting industrial requirements. The pine, however, presented a specific problem whose fundamental aspects have been discussed elsewhere *(2)*. The pulps from both aspen

[1] Member TAPPI, Formerly Assistant Professor of Forestry, University of Minnesota, St. Paul, Minn., Now Acting Director of Lignin and Cellulose Research, Dept. of Chemistry and Chemical Engineering, University of Washington, Seattle, Wash.

and pine were light colored and were easily bleached by alkaline hypochlorite.

Removal of Resistant Lignin

The composition of the residue from cook 13 was: alpha cellulose, 70.3 per cent; Cross and Bevan cellulose, 82.3 per cent; lignin, 12.5 per cent; pentosans, absent; unknown, 5.2 per cent. Residue from this cook was digested further in equal parts of butanol and water made 2 per cent in NaOH for periods of time from 15 min. to 2 hr. It was found that the resistant lignin was removed virtually completely at the end of 2 hr. by these reagents, but at severe expense to the yield, only 17.9 per cent of the original wood being obtained as a residue.

As the literature and observations made during experimental work pointed to the combination of the butanol and lignin, it appeared to be of value to determine the effect of a lower concentration of butanol. However, while butanol and water are miscible at the digestion temperature used, the solubility at room temperature is only 8-9 per cent, the lignin condensation product remaining in the alcohol layer. Use of butanol-saturated water (8-9 per cent butanol) would therefore precipitate the lignin condensation product on the pulp. This circumstance was precluded by making the liquor 2 per cent in NaOH. Digestions were run using butanol-saturated water made 2 per cent in NaOH for periods exceeding 8 hr., the alkali serving the double function of splitting the resistant lignin from the carbohydrate and solubilizing it in the aqueous liquor, while the butanol served merely as a reactant and not as a solvent. As was feared, however, reduction in butanol concentration seriously lowered the rate of reaction, a yield of 53.8 per cent being obtained at the end of 4 hr. and 38.4 per cent at the end of 8 hr. Evidence of incomplete delignification was the lighter than normal color of the final liquor and dark color of the residual pulp. Unfortunately, a secondary reaction induced by long exposure to alkali, noted in other experiments but as yet not clearly understood, darkened the residual pulp, especially in the longer cooks to approximately the color of roasted coffee, and discouraged further pulping attempts in this direction.

Alkaline Digestion of Pine

The work reported in the first paper of this series demonstrated that alkaline digestion split off that portion of the lignin chemically combined to the cellulose. Its subsequent behavior indicated that its general characteristics were then identical to the uncombined lignin. Hence, it appeared logical to assume that splitting the ligno-cellulose bond early in the cooking should render all of the lignin susceptible to condensation with butanol. Use of NaOH as the splitting agent would also result in the formation of water-soluble sodium lignate, a significant fact as pointed out below. A potential handicap of this procedure would be the reduction in the yield of cellulose, rendering the method useless, unless the rate of lignin splitting and combination greatly exceeded the rate of cellulose hydrolysis.

Maintaining the digestion pressure constant at 132 lb. per sq. in., and the liquor-wood ratio approximately constant at 20 to 1, a series of cooks were carried out to determine the possibility of producing a commercially practical pulp from jack pine. In all cases the butanol concentration was 50 per cent by volume, and NaOH was added in quantities of ¼ per cent of the volume of the digesting liquor; the only variables in the process being the alkali concentration and the time of digestion. The alkali was maintained at a constant value while time was varied throughout the practical range; then the alkali concentration changed and a new series of cooks were run.

As was anticipated, water soluble sodium lignate was formed with no deleterious effect upon either pulp or lignin. After filtering the spent liquor on a Büchner funnel, it was set aside for analysis, to be reported in a later paper, while the pulp was washed with distilled water, then dilute acid (preferably 0.1 *N* hydrochloric) to convert the sodium lignate to free butanol-lignin. Subsequent washing with dilute alkali (preferably 0.1 *N* sodium hydroxide) reformed and dissolved the sodium lignate. As the free butanol-lignin was light in color and the sodium lignate solutions a dark brown, alternate acid-alkali washes turned the pulp light and dark, and were continued until little change could be detected, two or three alternations usually being sufficient. The final acid wash was 0.1 *N* acetic; subsequent rinses of distilled water sufficed for acid removal. Pulp yields were then determined by drying at 105 deg. C., and after grinding, the residue was analyzed for lignin by the method of Ritter and Barbour *(18)*. The times of digestion, alkali concentrations, yields, and lignin contents for jack pine are represented in Fig. 1.

The curves representing the results of digestion using 1 and 4 per cent alkali are omitted as having no practical value. A concentration of 1 per cent alkali did not result in sufficiently rapid solution of the lignin, while hydrolysis of the cellulose due to the long time of digestion was too great to be of commercial interest, a typical 4-hr. cook yielding 58.3 per cent of residue having a lignin content of 30.6 per cent. The 4-per cent alkali concentration also failed due to the rapid hydrolysis of the cellulose. From an inspection of the curves in Fig. 1, it is ap-

TABLE II—DIGESTION, RESIDUE YIELDS, AND DELIGNIFICATION DATA

			Time			Residue after cooking		Lignin in residue		
Cook no.	Sample	Reagents	To reach cooking temperature, min.	At cooking temperature, hr.	To cool to room pressure, min.	Basis of sample, per cent	Basis of orig. wood per cent	Basis of residue per cent	Basis of orig. wood per cent	Orig. lignin left, per cent
12	40 g. untreated pine	2 liters butanol and water 1:1	45	4	45	47.3	47.8	15.1	7.2	27.4
13	12 g. residue from 12	1 liter butanol and water 1:1	25	3	40	87.4	41.7	12.5	5.2	19.9
18	45 g. untreated aspen	same as 12	45	4	45	52.8	52.8	2.2	1.2	7.6
19	15 g. of residue from 18	same as 13	25	3	40	92.4	48.7	1.1	0.3	1.9

parent that the optimum conditions at the given pressure were an alkali concentration of 2 per cent and time at pressure of an hour or slightly less, yielding 43 per cent of pulp having a lignin content of about ⅔ per cent. As these latter were close to present industrial standards and as the time of digestion was less than one quarter as long, the process has distinct advantages.

Mechanism of Pulping

Data and observations of jack pine pulping led to the formulation of an hypothesis of the mechanism of the pulping reaction. As it was shown earlier *(2)* that 80 per cent of the lignin was not chemically combined to the cellulose or other carbohydrate, and from observations regarding the chemical nature of the lignin, it appeared that the pulping consisted of one minor reaction, the splitting of the combined lignin from the cellulose, and two major reactions: the condensation of butanol and lignin, and the hydrolysis of the cellulose, the latter destructive, the former essential, and both increasing with alkali concentration. In effect, then, the two were opposed and successful pulping depended upon maximizing the condensation and minimizing the hydrolysis in order to obtain the best aggregate effect. Considering only the 2 major reactions, inasmuch as 80 per cent of the lignin was chemically free, the logical explanation of the increased delignification with increasing alkali concentration was that the effect of alkali was chiefly catalytic upon the lignin-butanol condensation and not hydrolytic upon a lignin-cellulose complex, Increasing alkali content would be expected, within reasonable limits, to accelerate the condensation. However, from the curves in Fig. 1, it is clearly apparent that while condensation increased greatly, the actual yield of pulp decreased abnormally. The explanation of this anomaly appeared to be that the higher alkali content

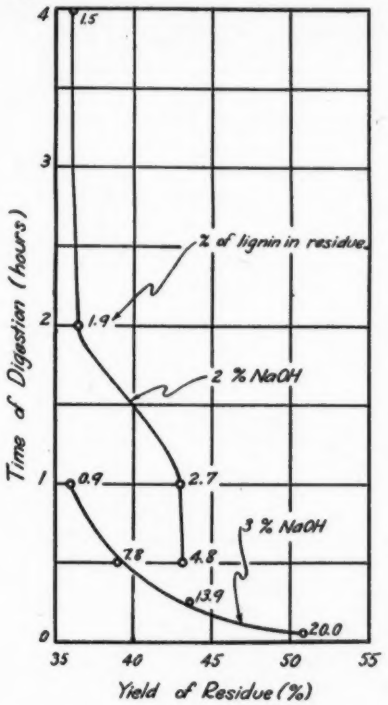

FIG. 1.
Lignin Content and Relation of Jack Pine Yields to Time of Digestion and Alkali Concentration.

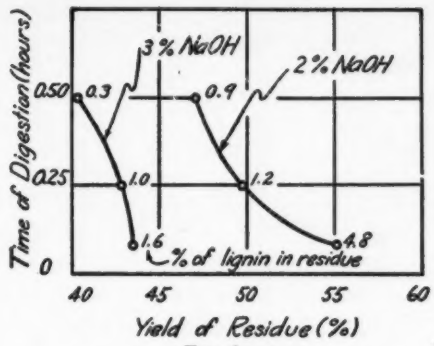

FIG. 2.
Lignin Content and Relation of Aspen Yields to Time of Digestion and Alkali Concentration.

increased the rate of cellulose hydrolysis much more rapidly than it increased the rate of lignin-butanol condensation. This hypothesis, then, seemed to supply a working conception of the mechanism of the pulping reactions.

Aspen Pulping

To check the validity of the theory and to attempt to improve the butanolysis of aspen, series of cooks similar to those run on jack pine were carried out on aspen samples, prepared and digested in the manner described above. The results of these series are represented in Fig. 2.

The optimum conditions of digestion for aspen at the given pressure were an alkali concentration of 2 per cent and time at pressure of about 15 min., yielding 49.8 per cent of pulp having a lignin content of 1.2 per cent, Fig. 2. As the yield and lignin content are somewhat superior to commercial standards and the time of digestion is less than 10 per cent of the usual requirements, this method of pulping appears to represent a definite improvement, (U. S. patent 2,166,540; July 18, 1939).

To complete the data presented in Figs. 1 and 2, Table III is included to show the details of digestion.

TABLE III.—PULPING DATA ON ALKALINE BUTANOL-WATER COOKS[1]

Cook no.	Sample	NaOH conc., per cent	Time at pressure, min.	Yield of pulp, per cent	Lignin in residue, per cent	Remarks on pulp
33	Jack pine	2	240	36.1	1.5	light sand colored, tough when dry
34	Jack pine	2	120	37.0	1.9	light sand colored, tough when dry
35	Jack pine	2	60	43.0	2.8	light brown, moderately tough when dry
43	Jack pine	2	30	43.1	4.8	light brown, moderately tough when dry
36	Jack pine	3	60	36.0	0.9	light gray, very tough when dry
37	Jack pine	3	30	39.0	7.8	light brownish, very tough when dry
38	Jack pine	3	15	43.6	13.9	light tan, moderately tough when dry
42	Jack pine	3	5	50.9	20.0	rather tan, moderately tough when dry
46	Aspen	2	30	47.1	0.9	nearly pure white, quite tough when dry
45	Aspen	2	15	49.8	1.2	nearly pure white, moderately tough when dry
44	Aspen	2	5	55.1	5.0	faintly pink, moderately tough when dry
40	Aspen	3	30	40.3	0.3	pure white nearly pure white
39	Aspen	3	15	42.9	1.0	light, faintly pink,
41	Aspen	3	5	43.5	1.6	lacking in toughness when dry.

[1] All of these cooks used a 10 g. sample, 100 cc. of water, 100 cc. of butanol, and the amount of alkali indicated. They required 7 min. to reach a pressure of 132 lb. per sq. in., were held at pressure for the time indicated and required 25 min. to cool to atmospheric pressure.

Discussion of Results

The results of these alkaline cooks seemed to confirm the theory that the function of alkali in the butanol pulping of aspen was entirely catalytic, since the rate of the lignin-butanol condensation was increased greatly, in spite of the fact that all the lignin was shown to be chemically free *(2)*. As further evidence in support of this theory, it may be mentioned that the isolated butanol-lignin condensation product appeared to be identical, whether extracted under neutral or alkaline conditions. Increasing the time of digestion of a given alkaline cook had the same effect in removing more lignin as did an increase in alkali concentration, while alkaline extraction caused increased delignification over neutral extraction in the same approximate ratio at both atmospheric and elevated pressures.

Although the present economic handicap in the use of butyl alcohol for pulping must be recognized, it is not as serious as it would at first appear. In general, better recovery could be expected, and at less cost, than in the use of inorganic reagents. Using the process outlined above or a modification of it, the water-soluble extractives, of course, are found in the water layer along with the water-soluble sodium lignate, only an extremely small portion of which remains in the alcohol layer. While this layer is somewhat colored, some of it was separated in a separatory funnel and reused in a similar cook and produced a pulp identical in yield and color to that produced by pure butanol.

The significance is obvious: neglecting the amount of alcohol condensed by the lignin, the used liquor could be drained from the blowpit to a storage tank, cooled to normal temperature (say 20 deg. C.) at which 50 per cent of the total liquor, i.e., the alcohol layer constituting 95-96 per cent of the original alcohol could be drawn off, while distilling off only one fifth to one tenth of the volume of the water layer from these experimental cooks demonstrated that most of the remaining 4-5 per cent of butanol dissolved in the water layer was recovered. In other words, mechanical separation and collecting a distillate of 5-10 per cent of the total volume of the liquor resulted in a recovery of 97-8 per cent. The waste products left in the final water layer remained in fairly concentrated form. From the standpoint of digestion, several advantages were apparent; reduction of time of cooking to a small fraction, making possible smaller or fewer digesters, the absence of a need for a corrosion-resistant digester lining, and the absence of obnoxious relief gases.

In conclusion, it is recognized that in the above cooks only one temperature was used while a higher temperature or different concentration of butanol might result in chemical and economic improvements. The relative ease of pulping pine and aspen by this process appears to be of about the same order as in commercial processes. Cooking a mixture of pine and aspen would be possible at a small sacrifice to the yield. Extrapolation of the 2 per cent curve for aspen in Fig. 2 indicates a yield of about 45-46 per cent for aspen, cooked one hour.

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TAPPI Notes

Howard W. Morgan has recently been appointed mill manager of the Munising Paper Company, Munising, Mich.

R. W. K. Ulm is now assistant paper mill superintendent of the Container Corporation of America plant at Manayunk, Pa.

Edward S. Lansing, formerly of Bagley & Sewall, is now president of the Lansing Machinery Company, Watertown, N. Y.

Frank G. Calkin, formerly of the Solvay Process Company, is now with the Virginia Smelting Company, West Norfolk, Va.

J. C. W. Evans, formerly of the St. Ann Paper Company, is now chief chemist of the Canadian Research Institute, Toronto, Ont.

The twenty-fifth anniversary of the Technical Association will be commemorated at the annual luncheon to be held at the Roosevelt Hotel on Thursday, February 22. Harry Fletcher of the Fletcher Paper Company and first president of the association will be one of the speakers. The TAPPI Medal will be presented to Otto Kress of the Institute of Paper Chemistry. This medal is presented to an individual who has made outstanding contributions to the technical advancement of the Pulp and Paper Industry.

Microscopy of Paper

L'Analyse Microscopique des Papiers by L. Vidal has recently been published by the French monthly Le Papier, 63, Avenue des Champs-Elysees, Paris, France. Professor Vidal is Director of L'Ecole Francais de Papeterie, Grenoble, France. It is a 148-page book 11 x 15 inches, well printed and profusely illustrated with full page colored plates.

Included in the subjects covered are the following: instruments, stains, agricultural waste fibers, wood fibers and animal fibers. There is a short bibliography and alphabetical index. Unfortunately, there is but relatively little credit given to the work of John Graff of the Institute of Paper Chemistry whose efforts in the development of the C-stain have broadened the scope of microscopic identification far beyond the older methods described. It is, however, an interesting supplement to the information furnished by Mr. Graff in his new book on this subject now being printed.

Kieffer Pays 4 Per Cent Bonus

BROWNSTOWN, Ind., January 8, 1940—The Kieffer Paper Mills here has announced payment of a four per cent bonus to its employees. Officials said the plant is operating at capacity. Last year the firm paid three per cent bonus.

Investigation of Antitarnish Paper*

By Herbert W. Rowe[1] and Otto Kress[2]

Abstract

1. *The presence of hydrogen sulphide is the most important factor in the tarnishing of silver.*
2. *Copper acetate and cadmium acetate are the most effective in protecting silver from tarnishing. Furthermore, these salts impregnated in paper absorb hydrogen sulphide preferentially to silver wrapped in plain paper.*
3. *Copper acetate is to be preferred to cadmium acetate because of the high cost of the latter. Antitarnish kraft papers impregnated with 2.3 per cent copper acetate were found to be at least ten to twenty times more effective in preventing the tarnishing of silverware by hydrogen sulphide than were the unimpregnated antitarnish kraft papers.*
4. *Paper containing 1.4 per cent copper oxide, which had been added as copper hydroxide to the beater furnish, proved to be at least ten times more effective than the same paper without copper oxide, from the standpoint of its ability to prevent the tarnishing of silver in an atmosphere of hydrogen sulphide.*
5. *Impregnation did not impair the physical characteristics of the paper.*

Although the manufacture of antitarnish paper is only a very small part of the vast paper industry, this minor product is often a source of trouble because of its possible failure in use. If antitarnish paper could be depended upon to protect at all times the articles about which it is wrapped, the use of such paper would no doubt decidedly increase.

Most antitarnish paper today is a 10- to 16-pound tissue made usually from kraft or sulphite pulp. This pulp is specially washed, care being taken to avoid excess free sulphur or acids in the paper. In spite of the extra labor involved in the manufacture of this type of antitarnish paper, it cannot always be relied upon in protecting metal ware from tarnishing.

At present, there is no simple, accurate test for the antitarnish qualities in a paper. The best test would be one that is correlated with the use requirements of that paper. Such a test would involve not only the particular type of metal that is to be wrapped but also the average atmospheric conditions in which the metal and paper are to be stored.

Historical Review

A survey of the literature on antitarnish papers has shown that there are two main ideas as to the cause of tarnishing and the type of paper that should be used to prevent tarnishing.

1. One group of investigators is of the opinion that tarnishing is caused by the paper itself. In the case of silver, tarnishing is said to be caused by the sulphur compounds in the paper, whereas in the case of steel and aluminum, it is caused by the presence of free acids. As early as 1902, Herzberg *(9)* recognized the fact that paper suitable for wrapping steel goods might not be suitable for wrapping silverware. Paper for wrapping silver should be free from sulphur, sulphides, and dyestuffs containing sulphur; this stipulation is probably not necessary for paper used for wrapping steel goods. This fact was emphasized again in 1927 in an article on paper for packing metallic articles *(1)*.

In 1909, Klemm *(12)* stated that paper for wrapping metals must be not only free of harmful substances but also dense enough to prevent the passage of too much tarnishing gas. He tested the suitability of paper for wrapping steel by placing it in contact with polished steel for 24 hours.

In a similar way, Hutchins *(10)* tested the tarnish-proof quality of paper used for wrapping silver by exposing a highly polished flat surface of silver to a wet piece of the paper and examining it after three days. Schierholtz *(16)* coated paper with a gilt powder, placed it in an atmosphere of high humidity for 48 hours and, at the end of this time, inspected the gilt surface for traces of tarnishing.

There has been much dispute as to the nature and origin of substances producing tarnishing of metals wrapped in paper. One author *(4)* stated that paper for wrapping articles sensitive to chemicals should be free of chlorine, acids, and sulphur. On the other hand, another author *(3)* maintained that freedom from chlorine and acid is not the essential requirement of antitarnish papers. Schierholtz *(15)* showed that acidity in paper, originating from the hydrolysis of alum, is the prime cause of tarnishing of gilt powders used to decorate such papers. Hydrogen sulphide may develop through long and wet storage of rags and pulp *(1)*. Stevens *(18)* stated that paper for wrapping silverware must not contain over an average of 0.001 per cent active sulphur, and he attributed the presence of free sulphur in paper to rushed production. Knopff *(13)* stated that acids in paper actually establish an electrical potential that damages the gold used for decorating porcelain ware.

Soda pulp, which has a low sulphur content, is used for paper for wrapping needles *(5)*. Following the theory of Klemm *(12)*, this pulp is beaten for a long period, forming a slow stock, almost a glassine, to secure a dense sheet. This same idea is expressed in another article *(3)*, wherein it is stated that the best paper for wrapping steel is glassine coated on both sides with a good paraffin.

In spite of intensive efforts to keep harmful substances out of the paper, an unimpregnated antitarnish paper cannot always be relied upon to fulfill its requirements. Schierholtz *(15)* wrote: "Comparatively few types of commercial papers are free from tarnish-producing ingredients." Another author *(2)* warned that it is best not to guarantee chlorine-free or acid-free papers; even if they could be manufactured, they might not remain chlorine-free or acid-free in storage or transit.

2. A second group of investigators believes that tarnishing is due to conditions outside the paper and that hydrogen sulphide and other sulphur gases are

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A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the Degree of Master of Science from Lawrence College, June, 1938.

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the main factors in the tarnishing of silver whereas carbon dioxide and oxygen from the air are conducive to the tarnishing of steel and aluminum. Hence, they believe that the best tarnishproof qualities are embodied in a paper of low porosity, such as a waxed glassine, or even cellophane, or in a paper that contains some chemical capable of adsorbing these tarnishing gases before they reach the metal.

In 1920, Scott *(17)* wrote that paper treated with a mixture of light and heavy hydrocarbon oils would prevent corrosion of metals wrapped in it, while in 1927 Osborne *(14)* claimed that silverware or other polished metal articles could be protected from tarnishing by wrapping them in a tissue paper treated with zinc acetate.

Much work has been done on the tarnishproofing of textiles. In 1930, Grinnell Jones *(11)* stated: "It has long been known that silver tarnish consists in most cases of sulphide of silver." Accordingly, he patented the manufacture of a cloth impregnated with an insoluble silver compound for the purpose of wrapping silverware. The patents of Herring *(8)* describe a tarnishproof chest for holding silverware; this chest is made as air-tight as possible and is lined with a fabric upon which has been sprayed a solution of lead acetate. Aurand *(6)* received patents for a similar tarnishproof cloth made by impregnating a dyed textile fabric with a solution of cadmium acetate. Champlin *(7)* has developed a tarnishproof cloth by a combination of impregnation and waterproofing. The cloth is impregnated with a soluble metallic salt and is then treated with three to five per cent, by weight, of wax. The wax is said to help keep the chemicals in the cloth and water out of the cloth.

Thurber and Sholtz *(19)* have proposed the use of copper sulphate for the purpose of developing antitarnish qualities. Copper sulphate is added to stock, preferably in the beater, in order to transform the sulphur into an inactive form. The temperature is preferably kept above 130 deg. F., and the stock is in the beater for at least an hour before dumping. The inventors state that this and other soluble copper compounds may be added elsewhere during the manufacture of the paper and in excess to prevent tarnishing by the atmosphere. It is claimed that this paper will protect silver and other metals wrapped in it.

In 1936, Schierholtz *(16)* claimed that paper is rendered non-tarnishing to silver, bronze, etc., by treatment with alkaline earth bicarbonates in aqueous solution.

Presentation of Problem

A study of the literature indicated that the investigation of antitarnish paper should proceed according to the following outline:

1. The development of a suitable test for tarnishing.
2. A study of the variables in atmospheric conditions relative to tarnishing.
3. A study of the development of antitarnish qualities through impregnation, and a determination of the best substance or substances for preventing the tarnishing of silver.
4. A determination of the optimum concentration and conditions of application of the substance or substances best suited for preventing the tarnishing of silver.

Presentation and Discussion of Data

Preliminary tests of the tarnishing of silver were carried out by wrapping silver coins in various handsheets and subjecting them to controlled atmospheres of air, water vapor, and hydrogen sulphide; they were also tested in a vacuum. It was found that the presence of hydrogen sulphide was by far the most important factor in the tarnishing of silver. Very little tarnishing was evident on any of the other coins except those kept in the hydrogen sulphide atmosphere, but these presented a surprising array of colors from golden yellow to bright purple and blue, depending upon the thickness of the silver sulphide film formed. By further experimentation, it was found that silver, upon being exposed to hydrogen sulphide, underwent a constant change of color from yellow to red-purple to blue. This color change could probably be used, in conjunction with the Hardy color analyzer, as a measure of the degree of tarnishing if a smooth silver surface were involved. However, since this instrument is not available in most mills, the investigation of the tarnishing of smooth silver surfaces by hydrogen sulphide was continued, the time of exposure being controlled so that the silver could be classified visually as either tarnished or untarnished.

Papers were impregnated with metallic salts which are capable of reacting with hydrogen sulphide, but which would not affect the strength or permanence of the paper. Such salts would be, preferably, the acetates of those metals whose sulphides are insoluble, such as lead acetate, copper acetate, copper sulphate, zinc acetate, etc. Filter paper was dipped in solutions of these salts, pressed between paper towels, and dried on a steam drier. Pieces of polished silver foil were wrapped in these papers and exposed for definite periods of time, in quart jars, to a constant atmosphere of hydrogen sulphide, which was controlled by dropping sulphuric acid into a known amount of a standard solution of sodium sulphide placed in a test tube inside the jar just before the lid was screwed down. At first, a "blank," that is, a piece of silver wrapped in untreated paper, was put into the jar with each sample; however, it was found that many of the salts adsorbed hydrogen sulphide preferentially to silver wrapped in unimpregnated paper. Silver wrapped in untreated paper and kept in a jar containing other samples wrapped in the impregnated paper did not tarnish after 26½ hours of exposure to hydrogen sulphide, whereas the same sample, when kept by itself in a jar and exposed to the same amount of hydrogen sulphide, tarnished in 4½ hours. Hence, the investigation was continued with each sample in a separate jar and each of the two blanks in separate jars. All jars were given equal charges of hydrogen sulphide at the same time and were allowed to stand until the blanks became tarnished. Then the samples which remained untarnished were given another charge of hydrogen sulphide, as were clean blanks which had been substituted for the tarnished blanks. The inspection of samples and the recharging of the

TABLE I.—TARNISHING OF SILVER WRAPPED IN IMPREGNATED PAPERS

Salt Used	Number of Charges of Hydrogen Sulphide Required to Tarnish the Silver	Hours Required to Tarnish the Silver
Blank	1	11
Copper acetate	33	347
Cadmium acetate	33	347
Lead acetate	14	140
Nickel acetate	13	124
Zinc acetate	4	36
Manganous acetate	3	31
Manganous sulphate	2	15
Ferrous sulphate	2	15
Copper sulphate	1	11

hydrogen sulphide atmosphere surrounding them was continued until all of the samples had tarnished.

The results are given in Table I. From these results, it may be seen that copper acetate and cadmium acetate were the most effective in protecting silver from tarnishing. The high cost of cadmium acetate, however, completely eliminated it from consideration.

Accordingly, tests were made on silver wrapped in commercial 16-pound antitarnish kraft paper impregnated with different amounts of copper acetate. The concentration of copper acetate in the sheets was determined analytically. The results are shown in Table II.

TABLE II.—DATA ON COPPER ACETATE-IMPREGNATED 16-POUND ANTITARNISH KRAFT

Copper Acetate in Paper Per cent	Number of Charges of Hydrogen Sulphide Required to Tarnish the Silver	Hours Required to Tarnish the Silver
0.00 (Blank)	2	9
0.66	7	34
1.20	9	45
2.27	11	66

The data in Table II indicate that the higher the concentration of copper acetate in the paper the greater the protection afforded the silver, but that moderate concentrations of about 2.3 per cent (which are obtained by passing the paper through a bath of 5 per cent copper acetate, pressing and drying on the steam cylinder) give excellent protection without excessive cost. To illustrate how much more effective even a commercial antitarnish paper may be made by impregnation with copper acetate, two pieces of silver foil (each about two inches square) were wrapped, one in the untreated antitarnish kraft and the other in the sheet impregnated with 2.3 per cent copper acetate, and allowed to tarnish for 102 hours, during which time they received three charges of hydrogen sulphide. The brightness of these two pieces of silver was then determined on the General Electric Recording Spectrophotometer. The resulting curves are shown in Fig. 1. The top curve represents the silver wrapped in the impregnated kraft, and the bottom curves indicate the two sides of the silver wrapped in the unimpregnated kraft. They show clearly how much better the silver wrapped in the impregnated paper has retained its luster, as compared with that in the untreated antitarnish paper.

Probably the best place to apply the copper acetate would be in a size press or in the water boxes of the calender stacks. The *p*H of pure copper acetate in 5 per cent solution is 5.0, an acidity that should not give any particular trouble from corrosion.

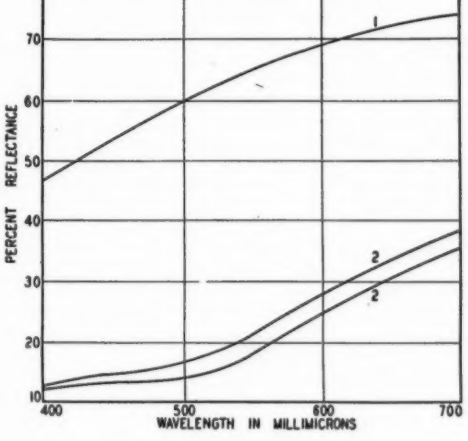

FIG. 1.

Since it may be difficult on certain machines to size press the light tissues used for antitarnish paper, an effort was made to develop a suitable paper by adding copper salts to the beater furnish. First, copper sulphate was added according to the directions of Thurber and Sholtz *(19)*. Very little success was obtained, as most of the salt was lost in the white water. Evidently a better way to impregnate pulp with copper would be to precipitate an insoluble compound, such as copper hydroxide, on the fibers in the beater. Good results were obtained by adding 20 per cent copper hydroxide to sulphite pulp while it was being agitated and following this with 3 per cent wax size and enough alum to obtain a *p*H of about 6.0. Under mill conditions, less copper hydroxide would be required since the white water would be reused. At this *p*H as much as 10 per cent of the copper hydroxide was found to redissolve upon standing for 48 hours, but the loss should be much less if the stock is made into paper soon after the hydroxide is added. This could be accomplished by adding the copper hydroxide to the stock at the fan pumps. Another way to avoid loss of copper would be to disperse the copper hydroxide in the wax emulsion and add the emulsion shortly before the beater is to be dumped. The copper hydroxide changed to the oxide when the paper passed over the driers, giving a sheet that was speckled with black copper oxide but which had an appearance that should not detract from its sales value. Analysis of the sheets showed them to contain 1.38 per cent copper oxide on the air-dry fiber. Tarnishing tests were made on silver wrapped in the paper impregnated with copper sulphate and in the paper impregnated with copper oxide. The results are given in Table III and show that the paper impregnated with copper oxide was far superior to that impregnated with copper sulphate.

TABLE III.—DATA ON PAPER FROM IMPREGNATED PULP

Paper	Number of Charges of Hydrogen Sulphide Required to Tarnish the Silver	Hours Required to Tarnish the Silver
A. From pulp treated with 2.5 per cent copper sulphate:		
Blank	1	10
I—Sized before impregnation	2	15
II—Sized after impregnation	1	10
B. From pulp treated with 1.38 per cent copper oxide:		
Blank	1	6
Impregnated	9	58

To test the ability of the paper developed in this work to meet use requirements, sterling silver spoons were wrapped individually in the antitarnish kraft paper impregnated with copper acetate and in the sulphite paper made from pulp impregnated with copper hydroxide and were subjected to the action of hydrogen sulphide. The data thus obtained are given in Table IV.

TABLE IV.—DATA ON TARNISHING OF STERLING SILVER SPOONS WRAPPED IN COPPER ACETATE- AND COPPER OXIDE-IMPREGNATED PAPERS

Paper	Number of Charges of Hydrogen Sulphide Required to Tarnish the Silver	Hours Required to Tarnish the Silver
Blanks:		
Plain antitarnish kraft	2	11
Plain handsheet	1	6
Containing copper acetate:		
0.66 per cent	5	28
1.20 per cent	6	34
2.27 per cent	10	57
Containing copper oxide:		
1.38 per cent	No tarnish	

(This experiment was discontinued after 10 charges and 57 hours.)

It is interesting to note that after 57 hours of exposure to hydrogen sulphide the kraft paper containing 2.27 per cent copper acetate dropped only 0.4 in brightness (from 17.4 to 17.0).

The superiority of impregnated papers for protecting silverware from tarnishing is again clearly demonstrated by the data shown in Table IV.

In these tests and in previous tarnishing tests, it was noticed that, whenever samples were removed from the jars in less than 24 hours, there was always present the odor of free hydrogen sulphide from the jars containing silver wrapped in blank paper, but never from the jars containing paper impregnated with copper acetate or copper oxide. This indicated that the copper salts had absorbed most of the hydrogen sulphide in those jars in a much shorter time than the usual six-hour run. It was decided to repeat some of the tarnishing tests, blow out the excess hydrogen sulphide at the end of the run, and titrate it with iodine to determine how much more had been taken up by the copper than by the silver. The results of these tests are given in Table V.

TABLE V.—PER CENT OF HYDROGEN SULPHIDE REMAINING AFTER SIX HOURS' TARNISHING

Sample	0.01*N* Thiosulphate Required for Hydrogen Sulphide Charge, cc.	Hydrogen Sulphide Remaining after 6 Hours	
		Gram	Per cent
No paper (full hydrogen sulphide charge)	34.0	0.00580	100.0
Kraft:			
Plain + silver	7.2	0.00123	21.2
0.66 per cent copper acetate	—0.5	0.000	0.0
1.20 per cent copper acetate	—0.2	0.000	0.0
2.27 per cent copper acetate	0.6	0.000	0.0
Handsheets:			
Plain + silver	7.2	0.00123	21.2
1.38 per cent copper oxide	3.8	0.00065	11.2

These data show clearly how much more effectively the copper salts remove hydrogen sulphide from the atmosphere than do the pieces of silver. They further indicate that the copper oxide papers are probably ten to twenty times as effective as plain paper in protecting silver, and that copper acetate papers are even more effective than the copper oxide-filled sheets.

Strength tests indicated that impregnation with copper acetate actually increased slightly the mullen and tear of the antitarnish kraft paper. After accelerated aging, there was very little difference in the mullen and tear of the impregnated and the unimpregnated paper.

It is of direct interest to note that a complete set of quality silverware, wrapped in 16-pound kraft impregnated with copper acetate from a 5 per cent solution, has been stored for over four months without the slightest sign of tarnishing.

Toxicology of Copper

In order to ascertain the possible hazards involved in the handling of copper acetate or copper hydroxide and paper containing such chemicals, letters of inquiry were sent to some of the largest manufacturers of copper compounds and also to the United States Public Health Service. On the whole, the replies were very favorable and would lead one to believe that, with reasonable precautions, the impregnation of paper with copper acetate or copper hydroxide would not endanger the health of either the producer or the consumer.

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11. Jones, G., U.S. patent 1,766,646 (June 24, 1930).
12. Klemm, P., *Wochbl. Papierfabr.* 40: 1675-81 (1909).
13. Knopff, M., *Zellstoff u. Papier* 11: 268 (1931).
14. Osborne, F. H., U.S. patent 1,628,610 (May 10, 1927).
15. Schierholtz, O. J., *Pulp Paper Mag. Can.* 36: 609-13 (1935).
16. Schierholtz, O. J., U.S. patent 2,033,452 (March 10, 1936).
17. Scott, J., *Paper-Maker* 59: 166-7 (1920).
18. Stevens, C. F. B., *Pulp Paper Mag. Can.* 39: 133-7 (1938).
19. Thurber, A. E., and Sholtz, R. H., U.S. patent 1,946,508 (Feb 13, 1934).

Engineering Papers at TAPPI Meeting

In its further effort to be of service to the engineers of the industry, the Technical Association of the Pulp and Paper Industry has arranged for the presentation of a number of papers of an engineering nature at its annual convention on February 19-22, 1940, at the Roosevelt Hotel, New York, N. Y. Following are some of the papers that should be of particular interest to engineers:

The Patent Situation by C. W. Rivise

The Rayonier Fernandina Water Treatment Plant by E. Nordell and C. Richheimer

White Water Flow Measurements by R. R. Fuller

Survey of Paper Mill Water Requirements by TAPPI Water Committee

The Wallin and Swenson Circulating System by Sven Fahlgren

The Economical Disposal of Waste Sulphite Liquor by G. H. Tomlinson and L. S. Wilcoxson

Recovery of Heat in Sulphite Mills by TAPPI Heat and Power Committee

Circulation and Storage of Kraft Pulp by G. A. Petroe

Recovery Unit Performance in Burning Kraft Process Black Liquor by L. S. Wilcoxson and F. G. Ely

Design of Gas Absorption Equipment by R. P. Whitney and J. E. Vivian

Maintenance of the Mill to Minimize Dirt and Bacteria by A.P.P.A. Microbiological Committee

Manufacture and use of Fourdrinier Wire by D. C. Dilley

Welding Stainless Steel by E. W. P. Smith

Paper Mill Construction by H. K. Ferguson and G. W. Dodge

Survey of Kraft Mill Construction Materials by J. A. Lee

Discussion of Packing Material for Pumps

Radiant Heat Drying of Paperboard by R. W. K. Ulm

Drying Rates for Pulp by L. G. Green

The Dowtherm System by Pell Foster

Centralized Lubrication by G. K. Kauffield

The Streams Flow Vat System by P. H. Goldsmith

The Dieckbrader Vacuum Deckle by A. Yraola

Consistency Regulators by Frederick Wierk

A. V. Howland Leaves for Nassau

BOSTON, Mass., January 8, 1940—A. V. Howland, vice-president and assistant treasurer of Tileston & Hollingsworth, left Boston Thursday, January 4, for Nassau in the Bahamas, planning to go from New York to Miami by train and by plane the rest of the way.

Weight Factors Of Beaten Pulps

By John H. Graff [1]

Abstract

The effect of beating on relative weight factors of pulps has been questioned for a long time; therefore the investigation described in this article was undertaken.

The results of this work show that beating has little or no effect upon the relative weight factor of a pulp, but the species of wood, especially in respect to its geographical location, is a factor of great importance.

This work also demonstrates that the tentatively proposed weight factors used by The Institute of Paper Chemistry require very little modification except that western hemlock and southern pine pulps must be considered separately.

Introduction

When a mixture of equal weights of two pulps (e.g., one gram each of rag and soda pulps) is mixed thoroughly and standard slides are prepared and examined under a microscope, it is observed that there are approximately twice as many soda fibers present as rag fibers. Therefore, if rag is given a value of one, soda would have a value of 0.5. These values have been designated *weight factors.*

Average Values

The above fact was first demonstrated by Spence and Krauss *(1)* in 1917; they found that the weight factors for different pulps varied considerably. Further investigations of the relative weight factors were made by Graff in 1925 *(2)*, by Landes in 1932 *(3)*, and again by Graff in 1933 *(4)*. The values obtained by these investigators, the average of these values and the standard deviations are shown in Table I.

The standard deviation (S.D.) is obtained from the formula

$$\text{S. D.} = \sqrt{\frac{\Sigma\delta^2}{N}},$$

in which δ is the difference between each observed value and the average, and N is the number of observations.

Facts Evidenced in Table I

The following facts are evident from Table I:

1. The hardwood soda weight factors obtained by the three investigators check fairly well as a group; the different woods also give fairly consistent values.

2. The hardwood sulphite factors seem to be higher than the soda factors, while the hardwood kraft pulp factors are still higher.

3. Both Landes and Graff found that the weight factors for Scandinavian coniferous pulps were higher than those for American eastern coast coniferous pulps; the values for western coast pulps were found to be somewhat higher than those for Scandinavian pulps.

A study of these data suggested the proposed weight factors used by The Institute of Paper Chemistry and given in Table II.

TABLE II.—PROPOSED WEIGHT FACTORS

Rag	1.000
Coniferous fibers	
Unbleached and bleached sulphite and kraft	0.900
Alpha	0.700
Hardwood fibers	
Soda	0.500
Sulphite	0.600
Kraft	0.700
Alpha	0.550
Groundwood	1.300
Bast and straw fibers	0.550

These factors have given fairly satisfactory results for general analyses of paper furnishes, but the question has always been raised: What effect does beating have upon the weight factors of the different types of fibers in paper?

In order to determine the effect of beating upon the weight factors of different pulps, the following pulps

TABLE I.—WEIGHT FACTORS OF UNBEATEN PULP FIBERS (Rag = 1.00)

Pulp	Spence and Krauss 1917	Graff 1925	Landes 1932	Graff 1933	Average	Standard Deviation
Softwood unbleached sulphite						
Unknown	0.860	0.736	....	....	0.798	0.0621
Eastern	....	....	....	0.782	0.782	.....
Hemlock	....	....	1.000	....	1.000	.....
Average					0.860	0.1045
Softwood bleached sulphite						
Eastern	....	0.840	0.909	0.820	0.856	0.0368
Hemlock	0.880	....	0.989	....	0.935	0.0581
Canadian	....	....	0.972	....	0.972	.....
Russian	....	....	0.979	....	0.979	.....
Scandinavian	....	0.986	1.066	1.021	1.024	.....
Western	....	....	1.312	1.160	1.236	0.076
Average					1.000	0.1750
Softwood alpha						
Unbleached	....	....	....	0.700	0.700	.....
Bleached	....	....	....	0.710	0.710	.....
Average					0.705	0.0709
Softwood unbleached kraft						
Eastern	....	0.907	....	0.870	0.889	0.01855
Unbleached refined	....	....	....	0.691	0.691	.....
Average					0.790	0.0992
Softwood bleached kraft						
Bleached	....	....	1.857	0.818	1.338	0.7210
Bleached refined	....	....	....	0.720	0.720	.....
Average					1.029	0.3100
Hardwood unbleached soda						
Maple	....	0.360	....	....	0.360	.....
Poplar	....	0.545	....	0.600	0.573	0.0286
Birch	....	0.521	....	....	0.521	.....
Average					0.485	0.0910
Hardwood bleached soda						
Maple	0.365	....	0.319	....	0.342	0.0230
Poplar	0.454	0.485	0.534	0.584	0.514	0.0490
Beech	0.525	....	0.500	....	0.513	0.0125
Birch	0.662	....	0.634	....	0.648	0.0140
Average					0.504	0.1090
Hardwood bleached sulphite						
Maple	....	....	....	0.524	0.524	.....
Standard	....	....	....	0.532	0.532	.....
Beech	....	....	....	0.585	0.585	.....
Poplar	....	....	....	0.590	0.590	.....
Birch	....	....	....	0.720	0.720	.....
Average					0.590	0.0704
Hardwood bleached alpha	....	....	....	0.543	0.543	.....
Hardwood kraft						
Unbleached	....	....	....	0.775	0.775	.....
Unbleached refined	....	....	....	0.613	0.613	.....
Bleached	....	....	....	0.706	0.706	.....
Bleached refined	....	....	....	0.635	0.635	.....
Average					0.682	0.0630
Groundwood	....	1.325	1.078	....	1.202	0.124

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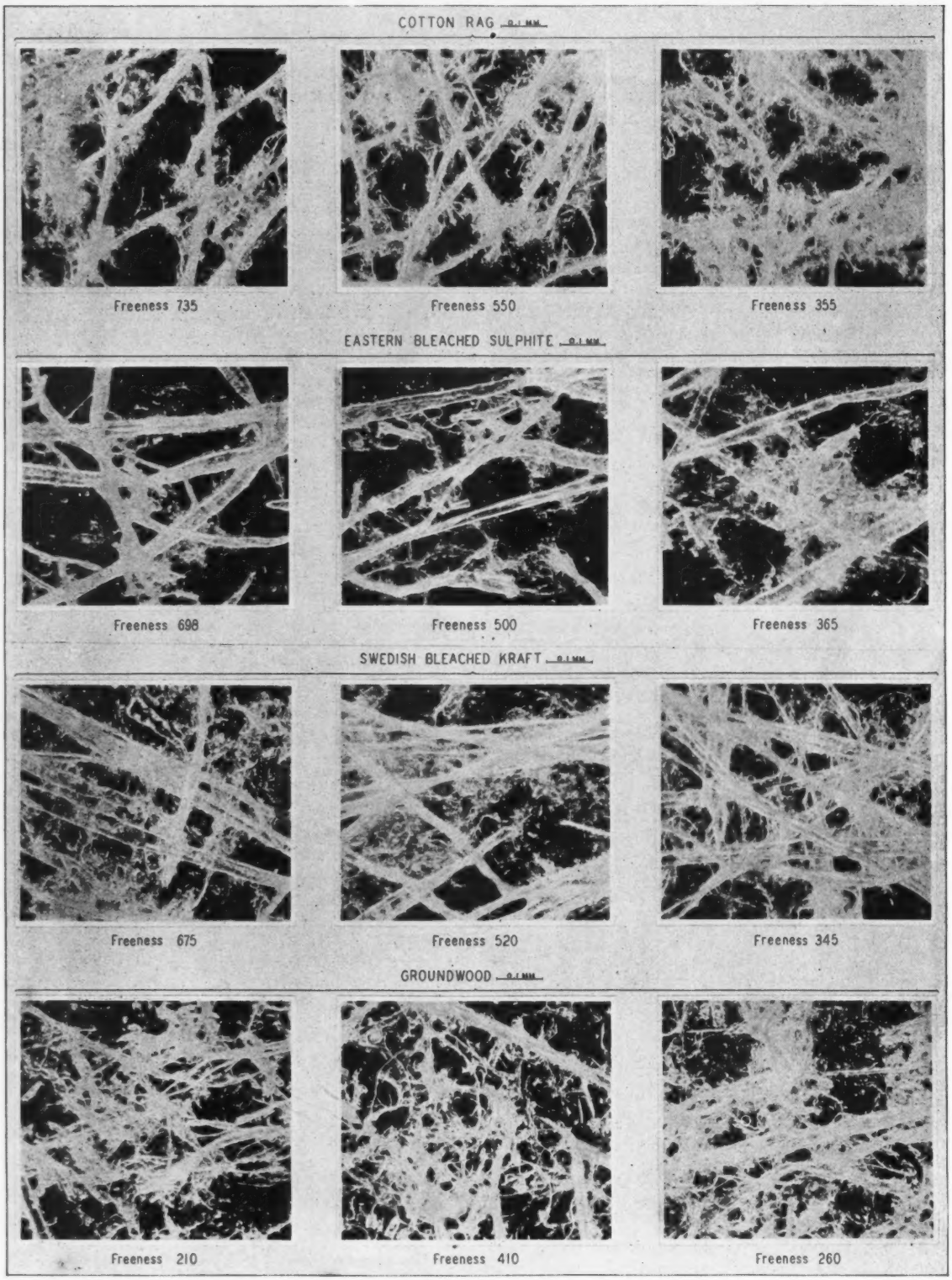


FIG. 1.

Photomicrographs showing relative degree of fibrillation and hydration in different freenesses.

were selected, each of which was beaten to three different degrees of freeness:

Pulp	Freeness		
Cotton rag	735	550	355
Softwood unbleached sulphite			
Canadian	730	545	405
Norwegian	685	585	360
Western	710	570	440
Softwood bleached sulphite			
Eastern	698	500	365
Swedish	695	510	410
Western	730	520	370
Softwood bleached alpha	675	490	390
Softwood unbleached kraft			
Middlewestern	725	555	385
Norwegian	660	460	380
Southern	735	575	310
Softwood bleached kraft			
Swedish	675	520	345
Hardwood bleached soda			
Middlewestern	750	525	340
Hardwood bleached sulphite			
Aspen	740	530	320
Groundwood			
Mill No. 1	210	...	...
Mill No. 2	410	...	...
Mill No. 3	260	...	...

The photomicrographs of some of these pulps show the relative degree of fibrillation and hydration at different freenesses (Fig. 1).

The following procedure was used in determining the weight factors of these pulps: Fifty-fifty mixtures were made of the rag pulps and each of the other pulps. The mixtures were thoroughly disintegrated and made into sheets in a 3.5-inch Büchner funnel; the sheets were then air-dried. A sector of about one-eighth of the total area of the sheets was cut out and disintegrated in water; standard slides were prepared from these pulp mixtures and the counts of the components made in the usual manner.

A total of four slides was examined for each sample; if the variation between the counts was too great, extra slides were counted. The average of the counts was used to determine the weight factor of each pulp in relation to the rag component. The results of these calculations are shown in Table III, in which the weight factors, the average weight factor, and the standard deviation (S.D.) are given for the pulp combinations listed below.

EXPLANATION OF THE COLUMNS IN TABLE III

a	Rag and other component, high freeness
b	Rag and other component, medium freeness
c	Rag and other component, low freeness
ab	Rag high, component medium freeness
ac	Rag high, component low freeness
ba	Rag medium, component high freeness
bc	Rag medium, component low freeness
ca	Rag low, component high freeness
cb	Rag low, component medium freeness

In the groundwood mixtures, the letters indicate the freeness of the rag component.

By using the above pulp mixtures, it has been possible to study the relation of the weight factors of the various pulps to the weight factor of rag under all possible combinations of relative freeness. An examination of Table III shows that there is no appreciable difference in these factors for a given pulp or for a combination of pulps (when beaten to different degrees of freeness) and that the standard deviation for the average weight factor in each group of pulps is smaller than that for two different pulps in the same group under the same conditions of beating.

The results confirm the findings of Graff *(2, 4)* and Landes *(3)* that the weight factor of Scandinavian coniferous pulps is higher than that of American eastern coast coniferous pulps and that the weight factor of western coast coniferous (hemlock) pulps is still higher. But the most outstanding result is that the *weight factor of southern unbleached kraft is 1.556, as compared to the average weight factor of 0.898 for middle western and Norwegian unbleached kraft.*

A comparison of the average results in Table III with the proposed weight factors of Table II is given in Table IV.

The values of Table IV show that the formerly proposed weight factors (Table II) require very little modification, except that the weight factors found for western sulphite (hemlock) and for southern kraft (Table III) pulps must be used when they are present in a paper furnish.

TABLE IV.—COMPARISON OF WEIGHT FACTORS OF UNBEATEN AND BEATEN PULPS

Pulp	Proposed Weight Factors Table II	Weight Factors Table III
Softwood unbleached sulphite	0.900	0.925
Western (hemlock)	....	1.260
Softwood bleached sulphite	0.900	0.865
Western (hemlock)	....	1.213
Softwood bleached alpha	0.700	0.664
Softwood unbleached kraft	0.900	0.898
Southern	....	1.556
Softwood bleached kraft	0.900	0.929
Hardwood bleached soda	0.500	0.601
Hardwood bleached sulphite	0.600	0.644
Groundwood	1.300	1.247

To complete the data on weight factors, calculations have been made for miscellaneous fibers, such as bast and straw fibers, and these values are compared with

TABLE III.—WEIGHT FACTORS OF BEATEN PULP FIBERS (Rag = 1.00)

SW = Softwood; HW = Hardwood

Pulp	a	b	c	ab	ac	ba	bc	ca	cb	Av.	S.D.
SW unbleached sulphite											
Canadian	0.930	0.880	0.855	0.950	0.895	0.830	0.954	0.910	0.878	0.898	0.039
Norwegian	0.897	0.942	0.985	0.950	1.003	0.900	0.924	0.975	0.992	0.952	0.038
Average	0.914	0.911	0.920	0.950	0.949	0.865	0.939	0.943	0.935	0.925	0.027
S.D.	0.016	0.031	0.065	0.000	0.054	0.035	0.015	0.033	0.057	....	....
Western	1.180	1.252	1.291	1.261	1.240	1.280	1.230	1.258	1.352	1.260	0.044
Eastern	0.786	0.835	0.868	0.772	0.770	0.778	0.797	0.892	0.792	0.810	0.042
Swedish	0.896	0.947	0.874	0.993	0.865	0.926	0.885	0.950	0.936	0.919	0.040
Average	0.841	0.891	0.871	0.883	0.818	0.852	0.841	0.921	0.864	0.865	0.029
S.D.	0.055	0.056	0.003	0.111	0.048	0.074	0.044	0.029	0.072	....	....
Western	1.252	1.340	1.129	1.151	1.135	1.261	1.138	1.260	1.248	1.213	0.071
SW Bleached alpha	0.610	0.660	0.757	0.732	0.575	0.681	0.655	0.640	0.667	0.664	0.054
SW Unbleached kraft											
Middle western	0.890	0.880	0.800	0.922	0.810	0.828	0.816	0.846	0.870	0.851	0.039
Norwegian	1.020	0.984	0.915	0.920	0.895	0.910	0.985	0.965	0.905	0.944	0.042
Average	0.955	0.932	0.858	0.921	0.855	0.869	0.901	0.906	0.888	0.898	0.032
S.D.	0.065	0.052	0.058	0.001	0.045	0.041	0.085	0.060	0.018	....	....
Southern	1.485	1.410	1.592	1.525	1.571	1.615	1.652	1.490	1.663	1.556	0.081
SW bleached kraft											
Swedish	0.888	0.948	0.914	0.934	0.972	0.947	0.958	0.895	0.906	0.929	0.028
HW bleached soda											
Middle western	0.592	0.553	0.643	0.581	0.604	0.564	0.615	0.627	0.632	0.601	0.029
HW bleached sulphite											
Aspen	0.593	0.622	0.647	0.772	0.672	0.577	0.589	0.629	0.692	0.644	0.058
Groundwood											
Freeness 210	1.230	1.228	1.206	....	....	....	....	....	....	1.221	0.011
Freeness 410	1.280	1.310	1.315	....	....	....	....	....	....	1.302	0.015
Freeness 260	1.240	1.204	1.210	....	....	....	....	....	....	1.218	0.015
Average	1.250	1.247	1.244	....	....	....	....	....	....	1.247	0.004
S.D.	0.022	0.046	0.051	....	....	....	....	....	....	....	..

those determined by Graff in 1925 and 1933 *(2, 4)*; these results are given in Table V.

Summary

The beating of pulp has practically no effect upon the weight factors of the fibers.

The weight factors of pulp show some variations with the species of wood and with its geographical location. The most outstanding example of this is western hemlock and southern pine.

The formerly proposed weight factors require very little modification except that western hemlock and southern pine pulps must be considered separately.

The values of the weight factors for bast and straw fibers show fairly good agreement.

Literature Cited

1. Spence, G. K., and Krauss, J. M., *Paper* 20, no. 11:11-13 (May 23, 1917).
2. Minor, J. E., and Graff, John H., *Paper Trade J.* 80, no. 8: 49-51 (Feb. 19, 1925).
3. Landes, W., *Paper Trade J.* 95, no. 6:27-30 (Aug. 11, 1932).
4. Graff, John H., Unpublished work.

TABLE V.—WEIGHT FACTORS OF MISCELLANEOUS FIBERS (Rag = 1.00)

Pulp	Graff 1925	Graff 1933	Institute 1938	Av.
Linen rag	....	....	1.075	1.075
Flax				
Unbleached tow	0.489	....	....	0.489
Bleached tow	0.483	....	....	0.483
Bleached straw	0.495	....	....	0.495
Hurds	....	....	0.348	0.348
Esparto				
Bleached	0.554	....	0.481	0.518
Hemp				
Bleached	0.606	....	....	0.606
Soda process	....	....	0.208	0.208
Manila				
Unbleached	0.559	0.635	0.654	0.616
Bleached	....	0.538	0.531	0.535
Jute				
Unbleached	0.657	....	0.611	0.634
Bleached	....	....	0.720	0.720
Pineapple	....	....	0.600	0.600
Straw				
Raw	....	....	0.565	0.565
Bleached rice	0.405	....	....	0.405
Bleached wheat	0.318	....	....	0.318
Corn stalk	....	....	0.536	0.536
Cane				
Bleached	....	....	0.745	0.745
Bamboo				
Unbleached	....	....	0.665	0.665
Bleached	....	....	0.451	0.451
Mitsumata	....	....	0.477	0.477

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

Specialties

Metallized Papers and Similar Products and Process for Their Manufacture. H. Sadler, V. Prey and O. Lang. Belg. 428,612 (Aug. 31, 1938).—A suspension of metallic particles or of plastic synthetic resins is added to the stuff and coagulated and the stuff is subjected to the usual treatments for making into paper.—A.P.-C.

Process and Device for Parchmentizing Webs of Fiberous Material. Papierindustrie Fritsch, Teplitz Schonau. Aust. pat. 151,243 (June 15, 1937).—The parchmentizing liquid (sulphuric acid) is brought onto one side of the sheet by spraying on the paper and if necessary it is sucked through the web. Then the sheet can be passed through a bath of the liquid and a recovery of the acid done in the usual manner. A quicker and more intensive penetration of the sheet is possible in this manner and a stronger and harder material is made.—J.F.O.

Reinforced Paper. William H. Millspaugh, assignor to Sandusky Foundry and Machine Company. U. S. pat. 2,148,490 (Feb. 28, 1939).—Two or more plies of paper are formed independently on vacuum-forming paper machines. A reinforcing fabric is fed between the plies, the fabric being coated while being fed between the plies. It is applied to the surface of one of the paper plies while the latter is still on the surface of the vacuum roll on which it was formed. The composite sheet is then heated and pressed.—A.P.-C.

Porous Absorbent Felt Sheet Material Suitable For Making Bituminous Impregnated Roofing. Thomas Robinson, assignor to Lancaster Processes Inc. U. S. pat. 2,142,334 (Jan. 3, 1939).—A porous absorbent felted sheet comprises rag fibers, waste-paper fibers, and from 10 to 50 per cent of disintegrated wood which has been defibered by subjecting a mass of small pieces of the wood, while under pressure and in the presence of not more than a relatively small amount of water, to mechanical action which will cause the individual pieces of the wood of the mass to be rubbed one against another until the pieces are broken down into a state of elementary fibers and small bundles of fibers.—A.P.-C.

Manufacture of Paper Carrier Sheet for Tacky Rubber. S. D. Warren Company, assignees of G. W. Coggeshall. Brit. pat. 497,348 (June 16, 1937).—A chemical wood pulp paper is deeply impregnated with glue, casein or starch made flexible by a compatible agent such as glycerin, triethanolamine or a sugar, and is afterwards calendered on both surfaces and coated on one surface with a lacquer containing not more than a small proportion of nitrocellulose, but other plasticized cellulose derivatives or vinyl or acryl resins are suitable constituents.—A.P.-C.

Multi Layer Roofing Paper. J. Drolshagen, Wuppertal Elberfeld. Ger. pat. 654,690 (Aug. 23, 1935).—The roofing paper consists of a base of roofing paper free from tar and a rubber asbestos fiber foil joined thereto by the use of bitumen.—J.F.O.

Manufacture of Safety Paper. T. Bausch, F. Bausch and V. Bausch. Brit. pat. 490,645 (Aug. 18, 1938).—The paper contains indicators giving color reactions with both reducing agents and acids. Thus iron or mercury tungstate may be used for the former, whilst for acid an iron or iron-cyanogen salt forming a complex acid of a metal of group VI is used (e.g., iron tungstate, ammonium "iron-cyanomolybdate"). The complex acid is stabilized by adding a buffering agent such as sodium borate.—A.P.-C.

Coloring Granules Such as Those of Trap Rock For Use on Roofing. Marion H. Veazey, assignor to Patent and Licensing Corporation. U. S. pat. 2,142,540 (Jan. 3, 1939).—The granules are coated with a pigment such as chromium oxide and sodium silicate, the coating is pregelled in the substantial absence of carbon dioxide, and the coated granules are thereafter heated sufficiently to insolubilize the silicate.—A.P.-C.

Roofing or Siding Material. Harold T. Lyman, assignor to Homasote Company. U. S. pat. 2,148,167 (Feb. 21, 1939).—A material adapted to be laid in

adjacent courses on a roof or the like comprises a base formed of substantially rigid heat-insulating material having a sheet of flexible weather-proofing material such as asphalt-saturated felt secured to one of its faces with a portion of the weather-proofing material projecting beyond an edge of the base to overlap material in an adjacent lower course. The base is formed with areas having expansion spaces therebetween serving to allow expansion and contraction of the intervening material without producing strains in the waterproofing material such as to cause curling at its edges.—A.P.-C.

Safety Paper. Stanley B. Chamberlain, assignor to Portals, Ltd. U. S. pat. 2,143,406 (Jan. 10, 1939).—During the manufacture of the paper there is laid in the web throughout its length a continuous filament made of an organic compound such as rayon having a flexibility of the order of that of the paper, and prior to such insertion in the web the filament is rendered electrically conductive throughout its length by applying to it a continuous film of metal such as gold or silver of extreme thinness. Such a filament in the paper may be detected by a described electric apparatus.—A.P.-C.

Shingle. George H. Graham, assignor to the Lehon Company. U. S. pat. 2,139,820 (Dec. 13, 1938).—The head lap end of the shingle is formed of a soft porous felt section permitting of higher degree of saturation. The butt portion is relatively hard and thin and carries a heavier mineral surfacing than the head portion.—A.P.-C.

Granular Roofing Material. Arthur D. MacNutt, assignor to Certain-Teed Products Corporation. U. S. pat. 2,138,456 (Nov. 29, 1938).—Granular material for surfacing roofing is provided with a coating of a substantially water-insoluble casein compound such as an alkaline earth metal caseinate.—A.P.-C.

Impregnated Roofing Felt. Pierre Drewsen, assignor to the Barrett Company. U. S. pat. 2,131,097 (Sept. 27, 1938).—From 15 to 45 per cent of wood fibers of relatively great strength (suitably unbleached sulphite or kraft pulp) are blended with 85 to 55 per cent of other wood fibers of relatively open structure and having high absorptive capacity (suitably obtained by cooking spruce or hemlock with 10 per cent sodium hydroxide or with sodium pentasulphide solution), so as to produce a felt having the desired strength and absorptive capacity.—A.P.-C.

Shingle Element. Chester R. MacDonald, assignor to The Patent and Licensing Corporation. U. S. pat. 2,150,004 (March 7, 1939).—A shingle blank cut from an impregnated and coated roofing felt is provided with an additional coating of waterproofing substance (such as asphalt) over substantially only the exposed portion of the upper face (including strips extending upwardly that are exposed between the shingle-simulating tabs over the course laid on top). The exposed butt and side edges and the under surface of the shingle are free from the additional coating, so that the saturation or coating of the shingle has a tendency to exude from the bottom and cause the shingle to stick to the underneath surface.—A.P.-C.

Method of and Machine for Making Tie Bands. John D. Lane, assignor to Ralph H. Wilbur. U. S. pat. 2,144,263 (Jan. 17, 1939).—Paper tie-bands adapted to be bonded together by bringing their end portions into contacting overlapping relationship are produced by progressively coating one surface of a moving paper web along one longitudinal margin and also along the opposite longitudinal margin on the opposite surface with a suitable adhesive (such as latex), drying the coated web, creasing the coated portions transversely to offset curling tendencies, and cutting transversely at regularly spaced intervals.—A.P.-C.

Siding Element and Method of Making the Same. Lester Kirschbraun, assignor to the Patent and Licensing Corporation. U. S. pat. 2,139,620 (Dec. 6, 1938).—A number of siding elements are obtained from a sheet of a fibrous insulating material by forming on the upper surface of the sheet spaced parallel grooves extending longitudinally of the sheet and a series of spaced transverse grooves extending through each of the zones intervening between the longitudinal grooves. The grooves of each of the series are in alignment transversely of the sheet and connect the longitudinally extending grooves. Recesses are formed on one longitudinal edge and one end edge of the sheet and tongues on the other longitudinal edge and other edge of the sheet. The sheet is separated into a series of separate siding elements by forming grooves on the opposite surface of the sheet with each of the last-named grooves having one side wall thereof substantially in cross-sectional alignment with one side wall of a longitudinal groove on the first-named surface.—A.P.-C.

Stencil Sheet. Charles V. Canning, assignor to Sweets Laboratories, Inc. U. S. pat. 2,140,506 (Dec. 20, 1938).—A paper sheet is coated with a composition comprising unvulcanized rubber, coumarone resin and an oil such as mineral oil which serves as a softening agent.—A.P.-C.

Process For the Manufacture of Transparent Oiled Paper. Renker-Belipa G.m.b.H. Blg. pat. 427,890 (June 30, 1938).—The paper is impregnated with mixtures of drying oils, such as linseed oil, dehydration products of castor oil, China wood oil, etc., and of practically nonoxidizable resins and oils.—A.P.-C.

Paper of High Wet and Dry Strength. Carl A. Anderson. U. S. pat. 2,146,281 (Feb. 7, 1939.)—Flexible paper is impregnated with a glue containing glycerin, the impregnated sheet is dried and the glue is air-hardened. The surface only of the dried glue in the sheet is treated with formaldehyde and the excess of the latter is removed. The sheet is dried quickly to keep the formaldehyde from penetrating throughout the sheet and to render the glue at the surface of the sheet water-insoluble and to retain the glue in the interior of the sheet water-soluble.—A.P.-C.

Waterproofing Permeable Materials. International Patents Development Company. Brit. pat. 492,601 (Sept. 19, 1938).—Fibrous material (such as paper) articles made from strawboards, wood fiber or paper pulp (such as paper cartons, fiber bottles and wooden bobbins) are rendered waterproof by being coated or impregnated with a solution of zein in an aqueous organic solvent containing a reactive aldehyde (such as formaldehyde or paraldehyde), most of the solvent being then removed and the product cured by heating.—A.P.-C.

Waterproofing Paper, Etc. Joseph G. Moore, Ernest Moore and Imperial Chemical Industries Ltd. Brit. pat. 488,937 (July 15, 1938).—A composition of chlorinated rubber, a plasticizer, e.g., dibutyl phthalate, tritolyl phosphate, a wax, e.g., paraffin, and a condensation product of a polybasic acid, e.g., phthalic acid, with a mixture of glycerol and one or more drying oils, e.g., linseed and (or) tung oil, is used. The chlorinated rubber preferably contains 65 per

cent chlorine. The resin may be "Paralac." The composition may be dissolved in a volatile hydrocarbon solvent, e.g., benzene, toluene, xylene, with or without an ester, e.g., butyl acetate, and may be applied by brushing or spraying or by passing a continuous web of the material through a bath of the solution.—A.P.-C.

Manufacture of Oil-or Water-Proom Paper. J. Knags and Portals, Ltd. Brit. pat. 488,787 (July 8, 1938).—The paper, before or after tub-sizing, is impregnated with a solution of a polyvinyl resin containing a dialkyl phthalate or tritolyl phosphate as plasticizer. The resin may be mixed with other waterproofing agents, e.g., cellulose esters or esthers, rubber or its derivatives, oils, waxes, etc. The resin solvent is removed by evaporation in a special chamber.—A.P.-C.

Process For the Production of Waterproof and Greaseproof Papers. O. Lang, Belg. pat. 426,594 (March 31, 1938).—Emulsified synthetic resins are added to the paper furnish to obtain insoluble plastic products. The sheets of paper thus obtained are calendered in absence of vulcanizing agents.—A.P.-C.

Waterproofing Wrapping Paper. Charles Ruzicka, Charles V. Sale and Geo. S. Sale (trading as Sale & Co.). Brit. pat. 492,608 (Sept. 22, 1938).—The paper is treated with a solution containing casein, soap and a metallic salt (such as sodium biborate), dried, treated with a solution containing an aldehyde (such as formaldehyde) and an organic acid (such as formic acid) and dried again. The order of the treatments may be reversed. During or after the final drying, the paper may be subjected to 50 to 100 degrees C. to increase the waterproofing properties.—A.P.-C.

Treatment of Wrapping Paper. British Waxed Wrappings, Ltd., and R. J. Browne. Brit. pat. 494,521 (April 26, 1937).—Waxed paper is impregnated with sulphonated and (or) unsulphonated castor or olive oil. When a mixture is used, the ratio of sulphonated to unsulphonated oil may be 1:1.—A.P.-C.

Treatment of Cellulosic Materials Such as Paper and Fabrics to Make Them Resistant to Water. Callender's Cable and Construction Company, Ltd., and T. L. Osborne. Brit. pat. 492,832 (May 25, 1937).—The cellulosic materials are impregnated with rosin, e.g., by soaking in a solution or suspension thereof, and dried under heat and vacuum, whereby the fibers are coated with a film of celulose resinate.

Impermeable and Decorative Paper for Wrapping Tobacco. Léonard Fils & Cie. Belg. pat. 428,945 (Aug. 31, 1938).—Two sheets of paper are combined by means of a tar-asphalt mixture. One of the faces of the combined sheet is covered with a thin metal foil, which may be colored.—A.P.-C.

Process For the Manufacture of Paper Impervious to Liquids and Gases and With Low Transparency. Titan Co., Wilmington. Ger. pat. 657,599 (April 26, 1936).—A mixture of such waxes and titanium pigments, and fatty acids in quantities of 0.05 to 0.5 per cent, calculated on the weight of the drenching mixture; are used for treating the paper.—J.F.O.

Sheet Material Formed of Wood Fiber and Admixed Materials. George H. Ellis and Wm. H. Schlafge, assignors to Insulite Company. U. S. pat. 2,143,831 (Jan. 10, 1939).—A strong water-resistant material is produced by defiberizing raw wood to produce a fiber too long and too coarse for the coarsest grade of paper, making an emulsion of a raw drying oil and water, by using oil in quantity equal to about 10 per cent of the dry weight of the finished product, and water in an amount substantially equal to the weight of the oil, adding a wax to the oil in proportion of about 1 to 4 per cent of the dry weight of the finished product and before emulsifying, adding to the water 1 to 2 per cent of sodium carbonate of the weight of the oil, adding the sodium carbonate water to the oil to complete the emulsion, adding the emulsion to the pulp, precipitating the emulsion, forming a porous sheet, drying the sheet to remove about 95 per cent of the water, and then simultaneously applying heat and pressure to the sheet, with the pressure 300 to 600 lb. per sq. in., and the temperature about 150 degrees to 260 degrees C., and operating 15 to 40 min.—A.P.-C.

Boards

Strawboard. Henkel & Co. G.m.b.H. Fr. pat. 831,702 (Jan. 5, 1938).—Straw is treated at 80 to 160 degrees C., with a dilute solution of acid or acid-reacting compound to remove up to 60 per cent of the pentosans, either as such or as furfuraldehyde (which may be recovered). After washing, the residue is subjected to an alkaline treatment (e.g., with milk of lime) for a much shorter time (15 to 60 min.) than usual (4 to 5 hrs.). The board produced from straw produced in this manner has much better folding properties than that produced in the usual manner.—A.P.-C.

Laminated Moisture-Resistant Material Suitable for Automobile Dash Panels, Etc. Meredith S. Randall and Gerhard E. Kasch, assignor to Woodall Industries, Inc. U. S. pat. 2,147,058 (Feb. 14, 1939).—The material comprises a resilient cushion-like layer of fibrous wadding the fibers of which are loosely secured together by scattered asphalt particles, enclosed (and in certain areas, compacted) between sheets of material impregnated with asphalt.—A.P.-C.

Identifiable Carton Board. James H. Brown assignor to American Coating Mills, Inc. U. S. pat. 2,143,682 (Jan. 10, 1939).—Details are given of a multiply paper board having its layers bonded by interfelted fibers and including between its front and back layers a layer artificially colored for its full thickness and in different colors in different portions thereof, by dyes of different colors absorbed in the material of the layer throughout its thickness. The intervening portions and adjacent layers are of natural stock color. There is a sufficient thickness of the paper board at each side of the artificially colored layer to conceal the colored design and colors thereof. The board is coated on its front side with clay coating material providing an opaque surface adapted to be printed upon.—A.P.-C.

Paper Stock Suitable for Making Butter Cartons, Etc. Fred L. Buchanan and Reynolds Guyer, assignors to Waldorf Paper Products Co. U. S. pat. 2,143,840 (Jan. 17, 1939).—A paper stock is formed comprising a facing of sufficient thickness and density and having suitable color characteristics to reflect light rays, a body portion of less thickness than the facing, the body portion having a coloring therein which serves to cause the body portion to absorb light rays, and a liner of less thickness than the facing capable of reflecting light rays, the liner having sufficient coloring therein to obscure bleeding through of the coloring in the body portion. A sulphur black aniline dye containing sodium sulphite may be used as the coloring material.—A.P.-C.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING JANUARY 6, 1940

SUMMARY

Wall paper.....2 cs.
Printing paper.....22 bls.
Kraft paper.....295 bls., 1,379 rolls
Drawing paper.....12 rolls, 46 cs.
Filter paper.....144 bls., 5 cs.
Basic paper.....22 bbls., 19 cs.
Surface coated paper.....33 cs.
Receipt paper.....356 rolls
Colored paper.....9 bls.
Cardboard.....6 cs.
Miscellaneous paper.....61 cs.

WALL PAPER

A. H. Jacobs Co., *Kagu Maru,* Yokohama, 2 cs.

PRINTING PAPER

J. E. Bernard & Co., *San Leonardo,* Antwerp, 22 bls.

KRAFT PAPER

Swedish Paper Corp., *Scanmail,* Gothenburg, 295 bls., 15 rolls.

Walker Goulard Plehn Co., Inc., *Scanmail,* Gothenburg, 1,364 rolls.

DRAWING PAPER

Rohner Gehrig & Co., *Volendam,* Rotterdam, 12 rolls, 46 cs.

FILTER PAPER

J. Manheimer, ———, Havre, 5 cs., 144 bls.

BASIC PAPER

R. Wilson Paper Corp., *Black Gull,* Antwerp, 19 cs., 22 bbls.

SURFACE COATED PAPER

Gevaert Co. of America, *San Leonardo,* Antwerp, 33 cs.

RECEIPT PAPER

National Cash Register Co., *Mormactide,* Copenhagen, 356 rolls.

COLORED PAPER

A. Asche, Co., *San Leonardo,* Antwerp, 9 bls.

CARDBOARD

Rohner Gehrig & Co., *Barbarigo,* Trieste, 6 cs.

MISCELLANEOUS PAPER

F. C. Strype, *Barbarigo,* Genoa, 61 cs.

RAGS, BAGGINGS, ETC.

W. Steck & Co., *San Leonardo,* Antwerp, 743 bls. flax waste.

Loumar Textile By Products, *Black Gull,* Antwerp, 88 bls. bagging.

W. Steck & Co., *Motomar,* Buenos Aires, 35 bls. old rags.

Darmstadt Scott & Courtney, *Carlier,* Antwerp, 192 bls. bagging.

E. J. Keller Co., Inc., *Carlier,* ———, 206 bls. bagging.

OLD ROPE

G. W. Millar & Co., Inc., *Black Gull,* Rotterdam, 23 coils.

E. J. Keller Co., Inc., *Noordam,* ———, 87 coils.

BONE GLUE

Transatlantic Animal By Products Co., *Barbarigo,* Trieste, 100 bags (sheets)

WOOD PULP

Cellulose Sales Co., Inc., *Scanpenn,* Trondhjem, 2,250 bls. dry sulphite, 150 bls. kraft sulphate.

Bulkley Dunton Pulp Co., Inc., *Scanpenn,* ———, 1,932 bls. kraft sulphate.

Guaranty Trust Co., *Olga S.,* Hernosand, 16,800 bls. prime strong kraft pulp, 1,200 bls. dry sulphite.

Bulkley Dunton Pulp Co., Inc., *Olga S.,* ———, 1,800 bls. dry sulphite.

Atterbury Bros., Inc., *Tyrifjord,* Oslo, 1,626 bls. dry bleached sulphite, 275 tons; 420 bls. moist unbleached sulphite, 77 tons.

Pagel Horton & Co., Inc., *Hemland,* Sweden, 1,416 bls. wood pulp.

Pagel Horton & Co., Inc., *Eros,* Sweden, 11,000 bls. wood pulp.

Perkins Goodwin & Co., *Eros,* Sweden, 5,010 bls. dry sulphate, 1,152 tons.

Bulkley Dunton Pulp Co., Inc., *Eros,* ———, 2,400 bls. dry sulphite, 400 tons.

Cellulose Sales Co., Inc., *Mormactide,* Hommelvik, 9,000 bls. dry sulphite, 1,578 tons.

Bulkley Dunton Pulp Co., Inc., *Mormactide,* ———, 2,970 bls. dry sulphite, 495 tons.

M. Sone, *Lisbeth,* Ornskoldsvik, 16,230 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING JANUARY 6, 1940

Nicolas & Co., *Barbarigo,* Genoa, 100 bags hide glue, (ground).

Transatlantic Animal By Products Co., *Barbarigo,* Genoa, 200 bags bone glue sheets.

Elliott Addressing Machine Co., *Kagu Maru,* Yokohama, 15 cs. paper.

Parsons & Whittemore, Inc., *Tortugas,* ———, 250 bls. wood pulp.

Pagel Horton & Co., Inc., *Peiping,* Sweden, 1,000 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING JANUARY 6, 1940

Pagel Horton & Co., Inc., *Rydboholm,* Sweden, 4,470 bls. wood pulp.

Pagel Horton & Co., Inc., *Glimmaren,* Sweden, 1,930 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING JANUARY 6, 1940

Irving Trust Co., *San Leonardo,* Antwerp, 118 bls. old bagging.

J. M. Hagy Waste Works, *San Leonardo,* Antwerp, 44 bls. rags.

E. J. Keller Co., Inc., *San Leonardo,* ———, 39 bls. old bagging.

Terminal Paper Co., *San Leonardo,* Antwerp, 26 bls. 1 cs. wrapping paper.

BALTIMORE IMPORTS

WEEK ENDING JANUARY 6, 1940

Bulkley Dunton Pulp Co., Inc., *Mormactide,* ———, 1,830 bls. dry sulphite, 305 tons.

M. Sone, *Peiping,* Sundsvall, 180 bls. wood pulp.

NEW ORLEANS IMPORTS

WEEK ENDING JANUARY 6, 1940

Pagel Horton & Co., Inc., *Tatra,* Sweden, 9,000 bls. wood pulp.

LOS ANGELES IMPORTS

WEEK ENDING JANUARY 6, 1940

———, *Rosebank,* Powell River, 960 pkgs newsprint.

———, *Josephine Lawrence,* Ocean Falls, 2,234 rolls newsprint, 350 bls. ground wood pulp, 42 tons.

———, *Wyoming,* Paris, 9 tons old rags.

———, *Wyoming,* Antwerp, 10 tons old rags.

Plan to Make Paper of Cotton

WASHINGTON, January 8, 1940—The Department of Agriculture, seeking additional outlets for cotton, announced today it would cooperate with the Writing Paper Manufacturers Association in making a small quantity of low-grade cotton into high-quality paper.

Under the program, according to the department, the association would buy lint cotton, spinnable waste and cotton linters for manufacture into writing paper and other fine papers. The association and the department will divide the cost of raw materials.

Participation would be opened to manufacturers regardless of membership in tne association, it is understood.

The Writing Paper Manufacturers Association states that, "Although the production of cotton goods has been increasing in recent years, there has not been a comparable increase in the supply of cotton cuttings usable in fine paper making. Many of the garments now produced have such extraneous materials as latex, acetate, rayon, etc., as well as fast colors which cannot be bleached out. Such new cotton cuttings are therefore either not usable or of little value as fiber in making fine paper. It is for this reason that rag content paper mills have been seeking an adjunct to the supply of rags and new cotton cuttings. Preliminary experiments with the use of cotton fiber have been successful, and it is now planned to conduct a number of commercial experiments along this line."

Watertown Section Active

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., January 8, 1940—The advent of the new year finds business conditions good in this section with prospects of a continuation for some time in the future. With the employment situation here at its high mark since the beginning of the depression and the consumer purchasing power substantially increased it is believed that 1940 may be a banner year for this district. An official of Knowlton Brothers, Inc., believes that it will take war orders to keep running and that the suspension of the war would cause a slump in business generally. The prospects of the Taggart Company for the new year are as good as usual. A dull period is just now being experienced because contracts are not made until after the beginning of the year. At Ogdensburg, the Algonquin Paper Company, employing several hundred men, has operated its plant 24 hours daily throughout the past year and the company stated that enough orders are on hand to insure the continuation of that schedule for the entire year. The George Hall Corporation, controlled by the concern, has had its most successful year since 1930.

New Warren Distributers

S. D. Warren Company, paper manufacturers, 2 Park avenue, New York, announces that arrangements have been completed for the distribution of its papers in New York City by Marquardt & Co., Inc., and the Schlosser Paper Corporation. These are in addition to the company's present New York merchants as follows: The Alling & Cory Company, Canfield Paper Company, Lathrop Paper Company, J. E. Linde Paper Company and Henry Lindenmeyr & Sons.

B. C. To Develop Pulp Resources

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., January 6, 1940—Conditions in Europe may make possible the development in British Columbia of more complete utilization of the pulp and paper potential resources of the province in the opinion of Andreas Christensen, technical adviser to the B. C. Pulp and Paper Company. He deplores the present policy of exporting large quantities of pulp logs from the province for final development elsewhere, and believes this situation may be materially altered by war conditions.

Mr. Christensen states that until recently shipments of pulp logs were being made to Japan and other countries at a time when Canadian pulp mills were idle because of frozen markets. Eastern Canada at the same time was shipping peeled logs to Germany, and these were later returned to the United States in the form of finished products that might just as easily, and to greater advantage have been supplied direct to the United States by Canadian manufacturers.

Dealing with the Japanese situation, Mr. Christensen said during the past few years Japan had built nine pulp mills. Three of these were utilizing straw and the remaining six used wood as a raw material. Of the latter six three were specially built and designed to use pulpwood imported by Japanese interests from British Columbia, and were entirely dependent upon this source of supply. Equipment for these plants was largely supplied by Sweden.

Veldown Co. Changes

GLENS FALLS, N. Y., January 8, 1940—Announcement is made here by the Veldown Company, Inc., of a number of changes in its staff. John A. Murray has been assigned to the company's territory in the Northwest where he will serve as sales representative with offices at Seattle, Wash. He left this week for San Francisco where he will meet P. E. Loer, West Coast district manager, and then proceed to Seattle. His territory will include the states of Washington, Oregon, Idaho and Montana. He is a graduate of Fordham University and has been with the local concern only a few months.

Walter W. Pulver, also of this city, has been transferred to the Philadelphia area and will also cover Maryland and the District of Columbia. He is a graduate of the local high school and has been employed in a sales capacity for over a year. It was also announced that Lionel Beakbane, of this city, has become associated with the concern in the sales department. Ernest K. Hunt will continue as sales manager of the concern which is a branch of the International Paper Company.

J. Solotken & Co. Damaged by Fire

INDIANAPOLIS, Ind., Januarv 8, 1940—Handicapped by bitterly cold weather, firemen fought a blaze in the paper stock plant of J. Solotken & Co., Inc., here late last week for hours. Damage was estimated at more than $15,000. The warehouse contained baled rags and paper and the fire spread rapidly. Although no fireman was injured, a battalion chief and a fireman fell into a hopper filled with ice cold water as they climbed through a window. The fire apparently started in the office and spread to the second floor.

Latest Review of Paper and Pulp Markets

Paper Production According To Latest Estimates Expected To Total 13,400,000 Tons For 1939 With All Divisions of Industry Reporting Best Year On Record — Current Week Reflects Seasonal Inventory Quiet.

Office of the PAPER TRADE JOURNAL.
Wednesday, January 10, 1940.

The first week of 1940 closed with reports from many manufacturers' representatives, jobbers, and general paper merchants, indicating that, following the normal and seasonal inventory period, business is expected to substantially increase during the first quarter of this year. Although some comment is heard that general industrial activity will decline a little in the next two months in some major industries, and is now reported declining in some heavy industries, such as steel and lumber, the prevailing opinion in the paper industry and trade appears to reflect the view that the production and distribution of most kinds of paper, paper board and paper products will be maintained at a high level for the first half of the current year.

This high level of activity is indicated by the index of general business activity which rose to 106.7 per cent for the week ended December 30, 1939, from 105.7 per cent for the preceding week, compared with 92.3 per cent for the last week in 1938.

Paper production of 160 mills during Christmas week declined to an estimated 73.9 per cent, compared with 63.6 per cent in 1938, with 47.0 per cent in 1937, and with 65.1 per cent for the corresponding week in 1936.

Paper board production for the week ended December 30, 1939, declined to 46.0 per cent, compared with 35.0 per cent in 1938, with 62.0 per cent in 1937, and with 63.0 pr cent for the corresponding week in 1936.

Reports from many quarters of the wholesale market reflect the opinion that the current seasonal lull will soon be terminated by a rise in sales, based upon an increasing consumer demand during the early months of this year. Prices on all grades of paper are firm and while no important changes in quotations on any grade of paper has been reported to date, a moderate upward revision in prices is expected and required, according to many, to adjust quotations at a more equitable level.

With the prospect of a substantial increase in advertising linage in prospect, the newsprint situation is improved. The price of $50 per ton is generally expected to prevail during the current year. Abitibi recently was reported as continuing its price of $50 per ton on roll newsprint for the second quarter of 1940. The current price range is from $49 to $50 per ton.

Mechanical Pulp

The demand for mechanical pulp continues active and prices on all grades are firm. No important change in this market has been reported during the current week.

Chemical Pulp

The demand for chemical pulp continues active and this market is reported as strong. Unbleached sulphite pulp continues to be reported as scarce. No change in quotations on any grade of domestic or imported pulp has been reported this week.

Rags

The rag market continues quiet with mill buying limited, which is a normal seasonal condition at this time of the year. No important change in the prevailing price quotations on any grade of new and old domestic rags has been reported this week.

Old Waste Paper

Prices on all grades of paper stock are unchanged this week, with the exception of white ledger stock which is a little lower, and currently quoted at from $1.50 to $1.60. The higher grades of waste paper are firm, while the lower grades are rather weak. The outlook for the near future is considered favorable in the trade and an upward revision in prices on some grades is looked for in the near future.

Twine

No important change in demand or prices has been reported on any grade of hard or soft fiber twine during the current week. Business prospects are considered in several quarters of the trade as favorable.

Celebrates 45th Anniversary

The John Leslie Paper Company, Minneapolis, St. Paul, and Great Falls, Montana celebrated the 45th anniversary of the company's establishment at its annul Christmas party, Wednesday, December 27, climaxing a two day general sales conference under the direction of Vice-President, Treasurer, and Sales Manager, Frank P. Leslie.

Respect was paid to the memory of the founder of the company, John Leslie, who died in January 1939, having actively presided over the company's activities for 45 years.

Thirty-eight members of the organization were awarded service pins for records of more than 15 years continuous service with the company. Twenty-one received 15 year pins; 10 received 20 year pins; two, 25 years; one, 30 years; three, 35 years; and one a 40 year award.

Eddy A. Clare, vice-president, presided at the banquet and introduced President Arnett W. Leslie, who spoke on the subject "Another 45 Years?"

Special recognition was given to Vice-President and Treasurer, Frank P. Leslie and Secretary Edward A. McAfee in the form of gifts for their daughters who were married during the holiday week.

Smythe Co. Employees Celebrate

PHILADELPHIA, Pa., January 2, 1940—Upwards of sixty employees of the J. L. N. Smythe Company, including the office and warehouse force, all the salesmen and officers of the company made merry in the commodious headquarters of the company during the holidays just passed. After singing Christmas carols, they all gathered around Santa Claus, impersonated by Leon Beck, who presented each one with an appropriate gift. More lucky than all the rest was Miss Florence Menge, one of the stenographers, who won a huge turkey,

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, January 10, 1940.

BLANC FIXE—Quotations on blanc fixe are reported unchanged under a less active demand. The pulp is currently quoted at from $42.50 to $45 per ton, in bulk; the powder is quoted at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Prices on bleaching powder are firm, with domestic demand a little less active for the week. Bleaching powder is currently quoted at from $2 to $2.85 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are unchanged for the current week. Standard domestic casein, 20-30 mesh, is currently quoted at 16½ cents per pound; 80-100 mesh, at 17 cents per pound. All prices in bags, car lots. Argentina casein, 20-30 mesh, is quoted at 14 cents per pound. The price of 14 cents per pound on French casein is nominal.

CAUSTIC SODA—Prices on caustic soda are firm under a less active domestic demand. Solid caustic soda is currently quoted at from $2.30 to $2.40 per 100 pounds; flake and ground at from $2.70 to $2.95 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay continue unchanged. Domestic filler clay is currently quoted at from $7 to $15 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $13.50 to $25 per ton, ship side.

CHLORINE—Prices on chlorine are firm under a moderate demand and conform to prevailing market levels. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported firm for this week, with prices unchanged. "G" gum rosin is currently quoted at $5.10 per 280 pounds, gross weight, in barrels, Savannah. "FF" wood rosin is quoted at $4.90 per 280 pounds, gross weight, in barrels, New York. Seventy per cent gum rosin size is quoted at $2.78 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Prices on salt cake are reported firm under a less heavy demand and practically nominal. Current prices range at from $15 to $19 per ton; chrome salt cake at $16 per ton, f.o.b., shipping point. Quotations on imported salt cake at $18 per ton are nominal.

SODA ASH—Quotations on soda ash are firm under a seasonal slackening in demand. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.10; and in barrels, $1.35.

STARCH—Prices on corn starch are reported unchanged for the week. Globe pearl is currently quoted at $2.50 per 100 pounds; special paper starch at $2.60 per 100 pounds; all prices in bags, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm under a moderate demand. The commercial grades are currently quoted at $1.15; iron free at $1.45 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm under a moderate demand and conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $19 per ton.

TALC—Quotations on talc are firm under a good demand and continue unchanged at prevailing market levels. Domestic talc is currently quoted at from $15 to $18 per ton, Eastern mines. Imported talc is quoted at from $25 to $45 per ton.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$5.00	@	$5.50
Superstandard	4.62½	"	5.00
Northern Standard Wrapping	4.25	"	4.62½
Standard Wrapping	4.00	"	—
Tissues—Per Ream—Carlots			
White No. 1	.87½	@	—
White No. 1 M. G.	.85	"	—
White No. 1½	.70	"	—
White No. 2	.65	"	—
Anti-Tarnish M. G.	.75	"	—
Colored	.80	"	—
Kraft	.75	"	—
Manila	.65	"	—
Unbl. Toilet, 1 M.	3.50	"	—
Bleached Toilet	5.26	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	1.85	@	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	10.25
No. 1 Manila Wrapping, 35 lb.	5.25	"	—
No. 2 Manila Wrapping, 35 lb.	5.00	"	—
Boards, per ton—			
News	45.00	@	—
Chip	45.00	"	—
Sgl. Mla. Ll. Chip	57.50	"	—
Jute Lined Chip	57.50	"	—
White Pat. Coated	70.00	"	—
Kraft Liners	55.00	"	—
Binders Boards	76.00	"	87.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10 @	$46.00	$40.25 @	$47.25
100% Rag	31.05 "	36.50	32.20 "	37.75
85% Rag	.... "	....	29.90 "	35.00
75% Rag	23.60 "	27.75	24.75 "	29.00
65% Rag	.... "	....	21.65 "	26.25
50% Rag	17.55 "	21.50	18.70 "	22.75
25% Rag	14.65 "	17.75	15.80 "	19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.95 @	$11.00	$10.10 @	$12.25
No. 2	8.05 "	9.75	9.25 "	11.25
No. 3	7.60 "	9.25	8.50 "	10.75
No. 4	7.30 "	9.00	8.50 "	10.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$11.90	@	$13.50
No. 2 Glossy Coated	10.35	"	11.75
No. 3 Glossy Coated	9.55	"	11.00
No. 4 Glossy Coated	9.15	"	10.50
No. 1 Antique (watermarked)	8.35	"	9.50
No. 2 Offset	7.70	"	9.00
A Grade E. F.	7.50	"	8.75
A Grade S. & S. C.	7.75	"	9.00
B Grade E. F.	6.95	"	8.00
B Grade S. & S. C.	7.20	"	8.25
C Grade E. F.	6.65	"	7.75
C Grade S. & S. C.	6.90	"	8.00
D Grade E. F.	6.40	"	7.50
D Grade S. & S. C.	6.65	"	7.75

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	$35.00	@	40.00
Dry	37.50	"	42.50

(Delivered)

No. 1 Domestic and Canadian	40.00	@	42.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.00	@	3.25
Prime Qualities—			
Easy-Bleaching Sulphite	2.85	"	—
Strong Unbleached Sulphite	2.75	"	—

(On Dock, Atlantic Ports)

Kraft Bleached	3.00	@	3.25
Kraft Light & Strong	1.95	"	2.35
Kraft No. 1	1.85	"	2.20

(F. o. b. Pulp Mill)

Kraft Domestic	1.60	"	2.12½

(Delivered)

Soda Bleached	2.90	"	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits. Also add extra freight charges and war insurance to all quotations on imported pulp.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.25	@	7.50
Silesias No. 1	4.50	"	4.75
New Unbleached	7.25	"	7.50
Blue Overall	5.00	"	5.25
Fancy	2.25	"	2.50
Washables	2.00	"	2.15
Mixed Khaki Cuttings	2.75	"	3.00
O. D. Khaki Cuttings	3.25	"	3.50

Old Rags

White, No. 1—			
Repacked	3.25	"	3.50
Miscellaneous	2.75	"	3.00
White, No. 2—			
Repacked	2.50	"	2.75
Miscellaneous	2.00	"	2.25
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.75	"	1.90
Roofing Rags—			
No. 1	1.50	"	1.55
No. 2	1.20	"	1.27½
No. 3 (bagging)	1.50	"	1.60
No. 4	.60	"	.65
No. 5A	.60	"	.65

Foreign Rags

All prices nominal.

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxford	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—

...of ordering your alkalies *often kick back!*

• • • but when you use Solvay Alkalies in the manufacture of your paper products you can depend on their high quality . . . depend on their constant uniformity *at all times.*

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 RECTOR STREET NEW YORK, N. Y.

BRANCH SALES OFFICES:

Boston Charlotte Chicago Cincinnati Cleveland Detroit Indianapolis
New Orleans New York Philadelphia Pittsburgh St. Louis Syracuse

SOLVAY ALKALIES

West Virginia Pulp and Paper Company

230 Park Ave. New York
35 East Wacker Drive Chicago
Public Ledger Building Philadelphia, Pa.
503 Market St. San Francisco, Cal.

Manufacturers of

ENGLISH FINISH SUPERCALENDERED MACHINE FINISHED BOOK and LITHOGRAPHIC PAPERS

Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Eggshell, Cover and Music Papers, Index Bristol, Post Card and Label Papers

HIGH GRADE COATED BOOK

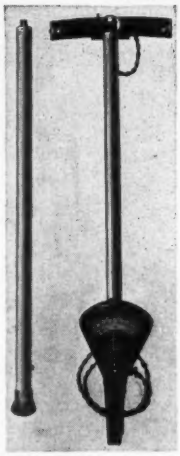
• • • •

KRAFT WRAPPING AND KRAFT ENVELOPE
KRAFT LINER BOARD
BLEACHED SULPHITE AND SODA PULP
BLEACHED AND UNBLEACHED KRAFT PULP

MILLS:

Mechanicville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Cass, West Virginia
Charleston, South Carolina

SURFACE TEMPERATURE OF ROLLS



The Cambridge is made with an extension attachment to reach otherwise inaccessible rolls.

determines the properties of the

FINISHED SHEET!

Drying roll temperatures materially affect the quality of the sizing and finish, and the strength of the finished paper. In order to maintain proper *surface* temperatures of the rolls the operator needs a quick, accurate and convenient instrument . . . the Cambridge Surface Pyrometer. The extension model is in constant use for this purpose in many prominent mills.

Cambridge Instrument Co., Inc.
3732 Grand Central Terminal
New York City

CAMBRIDGE SURFACE PYROMETERS

Send for descriptive literature. The use of these instruments will help you make better paper.

More than just a TRADE MARK

EXCELSIOR Knox Woolen Co. Camden, Me. FELTS & JACKETS

BUT also a guarantee by men who for 75 years have prided themselves in making finer felts. TO YOU —this is the mark of dependability, longer felt life and greater saving.

KNOX WOOLEN CO.
CAMDEN, MAINE.

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	"	4.75
No. 2 White Cotton.	3.25	"	3.75
No. 3 White Cotton.	2.50	"	3.00
No. 4 White Cotton.	1.90	"	2.20
Extra Light Prints..	2.00	"	2.40
Ord. Light Prints...	1.75	"	2.15
Med. Light Prints...	1.55	"	1.95
Dutch Blue Cottons.	2.25	"	2.50
French Blue Linens..	3.00	"	—
Checks and Blues...	2.00	"	—
Linsey Garments....	1.90	"	2.00
Dark Cottons.....	1.50	"	1.60
Old Shopperies.....	1.30	"	1.45
New Shopperies.....	1.45	"	1.50
French Blues.....	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.50	@	2.75
Domestic	2.25	"	2.50
Wool Tares, light...	1.75	"	2.00
Wool Tares, heavy..	1.80	"	1.90
Bright Bagging.....	2.25	"	2.50
Manila Rope—			
Foreign	4.25	"	4.50
Domestic	4.25	"	4.50
Jute Threads.....	3.00	"	3.25
Sisal Strings.....	2.00	"	2.25
Mixed Strings.....	.70	"	.85

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.10	@	3.25
Ordinary Hard White No. 1....	2.25	@	2.50
Soft White No. 1..	1.80	"	1.90
Soft White Extra..	2.50	"	2.60
Flat Stock—			
Stitchless	1.10	"	1.25
Overissue Mag....	1.00	"	1.10
Solid Flat Book...	.80	"	.90
Crumbled No. 1...	.70	"	.75
Ledger White Stock	1.50	"	1.60
Ledger Stock Colored	1.05	"	1.15
Manila—			
New Env. Cut....	1.70	"	1.80
New Cuttings.....	1.40	"	1.50
Old Kraft Machine— Compressed bales..	1.00	"	1.10
News—			
No. 1 White News	1.75	"	1.90
Strictly Overissue.	.70	"	.75
Strictly Folded....	.47½	"	.52½
Corrugated	.60	"	.65
No. 1 Mixed Paper..	.27½	"	.32½

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.18½	@	—
White Hemp.....	.18½	"	—
Fine Polished—			
Fine India.....	.23	"	—
Unpolished—			
Box	.14¾	"	—
Paper Makers.....	.15	"	—
Tube Rope.....	.16¼	"	—
Wall Paper.....	.15¾	"	—
Wrapping	.18	"	—
Soft Fiber Rope...	.16¼	"	—
Cotton	.21	"	—

(Hard Fiber)

Medium Java.....	.19	"	—
Mex. Sisal.....	.16	"	—
Manila	.24	"	—
Domestic	4.00	@	4.50
Sisal Rope	2.25	"	2.50
Mixed Rope	.75	"	1.00
Transmission Rope ..	3.00	"	—
Soft Jute Ropes.....	3.00	"	3.50
Jute Carpet Threads.	1.25	"	1.50
Gunny Bagging—			
Foreign	2.50	"	—
Domestic	2.25	"	2.30
Bleachery Burlap....	3.50	"	3.75
Scrap Burlap—			
Foreign	2.40	"	2.50
Domestic	1.90	"	2.00
Scrap Sisal.....	2.25	"	2.50
Scrap Sisal for Shredding	2.50	"	2.75
Wool Tares, Heavy..	2.50	"	2.60
New Burlap Cuttings	3.25	"	3.50
Aust. Wool Pouches.	3.25	"	3.50
Heavy baling bagging	2.65	"	2.75
Paper Mill Bagging..	1.25	"	1.50
No. 2 Bagging	1.10	"	1.25

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1...	.08	"	.08¼
New Light Flannelettes	.05	"	—
Silesias No. 1	.05	"	—
New Black Silesias..	.03½	"	)3¼
Soft Unbleached....	7.50	"	8.00
Blue Cheviots	.05½	"	.06
Fancy	.02	"	.02½
Washable	.02	"	.02½
Cottons—According to grades—			
Blue Overalls	.05¼	"	.05½
New Black, soft ..	.03¼	@	.04
Khaki Cuttings	.02½	"	.03
O. D. Khaki	03	"	.03¼
Corduroy	.02¾	"	.03
New Canvas.....	.06¾	"	.07¼
B. V. D. Cuttings...	.07	"	.07½

Domestic Rags (Old)

(F. o.b. Boston)

Canvas	.04¼	@	—
White No. 1—			
Repacked	—	"	2.75
Miscellaneous	2.50	"	2.75
White No. 2—			
Repacked	1.90	"	2.00
Miscellaneous	2.00	"	2.25
Twos and Blues	2.25	"	2.50
Old Blue Overalls ..	1.60	"	2.00
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.50	"	1.60
Black Stockings	4.00	"	4.25
Roofing Stock—			
No. 1.....	1.75	"	2.00
No. 2.....	1.60	"	1.65
No. 3.....	1.00	"	1.25

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....(nominal)	
Dutch Blues.....(nominal)	
New Checks and Blues(nominal)	
Old Fustians.....(nominal)	
Old Linsey Garments.(nominal)	
New Silesias.....(nominal)	

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f.o.b. Phila.)

Shirt Cuttings—			
New White No. 1.	.07¼	@	.07½
New White No. 2.	.04	"	.04½
Light Silesias.....	—	"	.04½
Silesias, No. 1....	—	"	.04½
Black Silesias, soft	—	"	.03¾
New Unbleached..	.05½	"	.06
Washable, No. 1..	—	"	.04
Blue Overall.....	—	"	.05
Cottons—According to grades—			
Washable No. 2...	—	"	.02
New Blue	—	"	.02
Fancy Percales.....	—	"	.03
New Black Soft....	—	"	.04
New Light Seconds	.04½	"	.05
New Dark Seconds	—	"	1.50
Khaki Cuttings—			
No. 1 O. D.....	.03½	"	.04
No. 2 Mixed.....	.03	"	.03¼
Corduroy	—	"	.02½
New Canvas.....	.05½	"	.06
New Black Mixed.	—	"	.03

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.75	"	3.00
Thirds and Blues—			
Miscellaneous	2.00	"	2.25
Repacked	2.50	"	2.75
Black Stockings (Export)	3.50	"	4.00
Roofing Stock—			
Foreign No. 1....Nominal			
Domestic No. 1..	1.50	"	1.60
Domestic No. 2...	1.35	"	1.45
Roofing Bagging..	—	"	1.30

Bagging

(f.o.b. Phila.)

Gunny, No. 1—			
Foreign .....Nominal			
Domestic	2.50	@	3.00
Manila Rope.....	—	"	4.50
Sisal Rope.....	1.75	"	2.00
Mixed Rope.....	1.25	"	1.50
Scrap—			
No. 1.....	2.50	"	2.75
No. 2.....	—	"	1.40
Wool Tares, heavy..	3.50	"	3.70
Mixed Strings	.75	"	1.00
No. 1 New Light Burlap	3.00	"	3.50
New Burlap Cuttings	2.00	"	2.25

Old Papers

(f.o b. Phila.)

Shavings—			
No. 1 Hard Write	2.25	@	2.30
No 2 Hard White	2.00	"	2.10
No. 1 Soft White	1.85	"	1.90
No. 2 Soft White	1.50	"	1.60
No. 1 Mixed.....	.90	"	1.00
Solid Ledger Stock..	1.50	"	1.60
Ledger Stock, white	1.30	"	1.35
Ledger Stock, colored	1.00	"	1.10
No. 1 Books, heavy..	.90	"	1.00
Manila Cuttings.....	1.90	"	2.00
Print Manila.....	.70	"	.75
Container Manila...	.65	"	.70
Kraft Paper.....	1.00	"	1.10
No. 1 Mixed Paper..	.55	"	—
Straw Board Chip..	.50	"	—
Binders Board Chip	.50	"	—
Corrugated Board...	.60	"	.65
Overissue News.....	.70	"	.75
Old Newspapers.....	.55	"	.60

BOSTON

Old Papers

(f.o.b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White	1.85	"	2.15
No. 2 Mixed.....	.75	"	.80
Solid Ledger Books..	1.30	"	—
Overissue Ledger Stock	1.30	"	1.50
Mixed Ledgers.....	.85	"	.90
No. 1 Books, heavy..	1.00	"	1.10
No. 1 Books, light..	.65	"	.75
Crumpled Stitchless Book Stock.....	.55	"	.65
Manila Env. Cuttings	1.70	"	1.85
Manila Envelope Cuttings, extra quality	2.35	"	2.60
White Blank News..	1.40	@	1.50
No. 1 Kraft.....	1.10	"	1.20
Mixed Papers.....	.40	"	.45
Print Manila.....	.65	"	.70
Container Manila...	.60	"	.70
Old Newspapers....	.60	"	.65
Paper Wool Strings	.80	"	.90
Overissue News.....	.70	"	.75
Box Board Chips....	.50	"	.52½
Corrugated Boxes....	.50	"	.60
Kraft corrugated boxes	.95	"	1.00
Screening Wrappers	.60	"	.70

Bagging

(f.o.b.Boston)

Manila Rope—			
Foreign	4.25	@	4.50

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots.			
No. 1 White $36.50		@	—
No. 1 Tints	37.50	"	—
No. 2 White	26.50	"	—
No. 2 Tints	27.50	"	—
No. 2 Golden Rod..	28.50	"	—
No. 3 White	22.00	"	—
No. 4 White	15.50	"	—
No. 4 Tints	16.50	"	—
No. 4 Golden Rod..	17.50	"	—
Direct mill shipment in three-ton lots.			
No. 5 White $10.40		@	—
No. 5 Tints	11.40	"	—
No. 5 Golden Rod..	12.40	"	—
No. 6 White	9.40	"	—
No. 6 Tints	9.90	"	—
No. 6 Golden Rod..	11.40	"	—
No. 7 White	8.40	"	—
No. 7 Tints	8.90	"	—
No. 7 Golden Rod..	10.40	"	—
Book—			
No. 1 M. F.	$7.75	"	—
No. 2 M. F.	7.25	"	—
No. 3 M. F.	6.60	"	—
No. 1 S. C.	8.25	"	—
No. 2 S. C.	7.75	"	—
No. 3 S. C.	6.25	"	—

Coated Book & Litho

Ton Lots (resale)

No. 1 .....$12.15		@	—
No. 2	10.50	"	—
No. 3	9.45	"	—
Coated tinted.....	13.20	"	—
Golden Rod.....	14.80	"	—
Wrapping—delivered—			
Rag Brown.....	4.85	"	5.25
White Wrap.....	4.00	"	—
"B" Manila.....	4.90	"	5.15

No. 1 Manila....	$5.50	@	$6.90
Fiber	5.50	"	6.90
Kraft No. 2.....	5.50	"	6.90

(f.o.b. Cars, Toronto)

News per ton—			
Rolls (contract)..	46.00	"	—
Sheets	54.00	"	—

Pulp

Ground wood.....$36.50		@	—
Unbleached sulphite.	54.00	"	—
Bleached sulphite...	64.00	"	—
Kraft	47.50	"	—
Soda	58.00	"	—

Old Waste Paper

(In carload lots, f.o.b. Toronto)

Shavings—			
White Env. Cut..	2.15	@	—
Soft White.....	2.00	"	2.15
White Blk. News..	1.35	"	1.50
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	"	1.00
Light and Crumpled Book Stock.....	.80	"	.90
Ledgers and Writings	1.15	"	—
Manilas—			
New Manila Cut..	1.55	"	1.60
Printed Manilas...	.77	"	—
Kraft	1.15	"	—
News and Scrap—			
Strictly Overissue	.75	"	—
Strictly Folded ..	.70	"	—
No. 1 Mixed Paper	.60	"	—

CHICAGO

Waste Paper

(f.o.b. Chicago)

Shavings—			
No. 1 White Envelope cuttings..	2.40	@	—
No. 1 Hard White	2.23	"	—
No. 1 Soft White	2.00	"	—
Ledger and Writings	1.20	"	—
Solid Books.....	.95	"	—
Blanks	1.70	"	—
Krafts	1.00	"	—
New Kraft Cuts.....	1.60	"	—
Overissue News.....	.80	"	—
Old Newspapers—			
No. 1 Folded News	.73	"	—
No. 1 Mixed Paper	.63	"	—
Roofing Stocks—			
No. 1	1.25	@	—
No. 2	1.15	"	—